SUMMER WORKSHOP
FOR
INDUSTRIAL ARTS INSTRUCTORS
OF THE BLIND

1961

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SUMMER WORKSHOP

FOR

INDUSTRIAL ARTS INSTRUCTORS OF THE BLIND

FINAL REPORT SUBMITTED TO THE OFFICE OF VOCATIONAL REHABILITATION, UNITED STATES OFFICE OF HEALTH EDUCATION AND WELFARE

TEACHING and TRAINEESHIP GRANT
OVR 240-61

STATE UNIVERSITY OF NEW YORK
COLLEGE OF EDUCATION AT OSWEGO

JULY 3 - AUGUST 11, 1961

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FINAL REPORT

TEACHING AND TRAINEESHIP GRANT
(Rehabilitation of the Blind)

OVR 241-61

SUMMER WORKSHOP

FOR

INDUSTRIAL ARTS INSTRUCTORS

OF THE BLIND

State University of New York
College of Education at Oswego
July 3 - August 11, 1961

Project Director - Dr. James R. Hastings
Professor of Industrial
Arts Education

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Part I

Background of the Project

The six week workshop program taught at State University College of Education at Oswego during the summer session of 1961 which this report covers was conducted on much the same pattern as the experimental program taught in 1960.

The workshop was conducted for the purpose of providing opportunity for industrial arts instructors of blind children in both resident schools and public schools to increase their technical competence and gain a better understanding of teaching procedures, aids and facilities for providing better industrial arts programs for blind students.

The need for the workshop was determined as a result of a special survey conducted by the American Foundation for the Blind which revealed a pressing need to have the programs and instructors of industrial arts upgraded in the several resident schools in the country. It was also deemed necessary that public school industrial arts instructors who are working in schools where blind students are enrolled also be permitted to attend this course to acquaint these teachers and others of the possibilities for blind students in their regular classes.

Since only eleven resident school instructors were served by the program in 1960 it was recommended that the program be conducted again during the summer of 1961. It was also determined that many resident school instructors who could benefit most from such a program were not fully qualified to be admitted to the program on a strictly graduate course basis. The program was therefore revised according to the Oswego College catalog description to enable those teachers who needed the program and were qualified, to enroll for undergraduate credit.

Special appreciation is expressed for the extensive counsel and assistance provided by the American Foundation for the Blind in providing published materials and the part-time services of Dr. Everett Wilcox and Mr. Arthur Voorhies of their staff during the conduct of the workshop. Special appreciation is expressed for the furnishing of the full time services of Dr. John Hurley who assisted immeasurably in the general supervision and guidance of the workshop.

WORKSHOP PARTICIPANTS AND STAFF

STAFF

Coordinator and Project Director

Dr. James R. Hastings
Professor of Industrial Arts
State University College of
Education, Oswego

Technical Laboratory Instructor

Mr. John Somerville
Associate Professor of Industrial Arts
State University College of
Education, Oswego

Education Professor

Dr. Charles Phallen
Professor of Industrial Arts
State University College of
Education, Oswego

High School Student Counselor

Mr. Samuel Paradise
Physical Education Instructor
New York State School for the Blind
Batavia, New York

Consultants

Dr. John M. Hurley
Supervisor of Industrial Arts
City of New York Public Schools

Mr. Arthur Voorhies
Program Specialist in Vocational
and Rehabilitation Services
American Foundation for the Blind

Dr. Everett E. Wilcox
Program Specialist in Education
American Foundation for the Blind

Mr. Robert Whitstock
Administrative Assistant
Seeing Eye Incorporated

Mrs. Ferne K. Root
Associate in Education of
Visually Handicapped
New York State Education Department

Mr. Russel C. Williams, Chief
Blind Rehabilitation, Physical
Medicine and Rehabilitation Service
Veteran's Administration

Mrs. Fredericka Bertram
Alameda, California

Mrs. Grace D. Napier
Braille Instructor and
Educational Counselor
New Jersey State Commission for Blind

Miss Emma Rowe
Resource Teacher
Miami, Florida

Mr. J. Richard Pfund
Assoc. Professor of Industrial Arts
State University College of
Education, Oswego

Consultants

Miss Geri Chandler
Resource Teacher
Denver Public Schools

Miss Evelyn Smith
Assistant Director
Vocational Rehabilitation Service
New York State Dept. of Social Welfare

Mr. Willard Allen
Associate Professor
Industrial Arts Transportation
State University College of
Education, Oswego

Mr. Arthur Greer
Associate Professor of Industrial
Arts (Metal)
State University College of
Education, Oswego

Mr. Joseph E. Vargo
Educational Consultant
Central Scientific Company

Dr. Charles Shoemaker
Associate Professor of Industrial
Arts (Electronics)
State University College of
Education, Oswego

Following approval of the continuation of the grant to conduct this year's workshop on April 1, 1961 brochures and letters were sent to a complete mailing list of 50 resident schools and approximately 1500 personnel consisting of industrial arts supervisors and special education personnel responsible for the education of blind students in over 450 public school systems.

From a large number of applications received, 15 people were selected for admission to the workshop. One person from Canada was also admitted but did not receive financial support during the workshop. The participants represented 13 different states and Canada. Ten of the people were from resident schools and five were from public school systems.

Workshop Participants

Name	Teaching Address
Allee, Fayette	Arizona State School for the Blind 1200 West Speedway Tucson, Arizona
Flumerfelt, Robert	Benson Polytechnic School 546 N.E. 12th Avenue Portland 12, Oregon
Hamilton, Edwin	School for Visually Handicapped Alamogardo, New Mexico

Workshop Participants

Name	Teaching Address
Holmes, Oliver	Arkansas School for the Blind Little Rock, Arkansas
Horky, Oliver	Roosevelt Junior High School 3366 Park Avenue San Diego 3, California
Iszler, George	State School for the Blind Grande Forks, North Dakota
Johnson, James	North Carolina State School for Deaf and Blind 3320 Garner Road Raleigh, North Carolina
Lawson, Larry	Texas State School for the Blind 45th and Lamar Austin, Texas
Morrisey, Thomas	Madison High School 101 Epworth Street Rochester, New York
Myers, Arthur	Percy Hughes School Jamesville Avenue Syracuse, New York
Orsak, John	Texas State School for the Blind 45th and Lamar Austin, Texas
Sowell, Herbert	Florida School for the Deaf and Blind St. Augustine, Florida
Spear, Henry	Overbrook School for the Blind 64th and Malvern Avenue Philadelphia, Pennsylvania
Thrun, Ronald	Earl Warren School Center Street Castro Valley, California

Blind High School Students

Student's Name and Address	Vision	Age	Grade
1. John Stankard Glenville, Connecticut	Totally Blind	18	11th
2. Charles Muntimuri Norwich, Connecticut	Totally Blind	18	11th
3. John Farnum Cuba, New York	Totally Blind	17	11th
4. Timothy Hendel Holley, New York	Totally Blind	16	10th
5. Roland LaPage Potsdam, New York	Totally Blind	18	9th

Part II

DEVELOPMENTS

Organization of the Workshop

In order to accomplish the broad purposes and objectives of the workshop three separate courses were designed. These courses were offered under the college numbering systems which would permit students to take them for either graduate or undergraduate credit depending upon the needs of the individual. College standards and requirements were maintained for those individuals taking the courses for graduate credit.

Course outlines for each of the three major courses are contained in the supplemental material submitted with this report for reference if desired.

Following is a brief description of the major courses describing how it was conducted and the way in which the course was coordinated with the overall program.

The Special Education Laboratory

This was a technical laboratory course meeting 4 hours a day for 6 weeks to provide technical instruction and experiences in the areas of woodwork, metalwork, electricity and transportation. Since it was anticipated there would be a wide range of experience and ability represented in the group, their needs were surveyed in advance and each person was programed for those demonstrations and lessons which best served his needs and abilities.

Each person was expected to concentrate in two areas of work in order to provide more depth of concentration appropriate to the needs of his own program.

It was determined that considerable emphasis should be devoted in the areas of electricity, electronics, and transportation. This is reflected in the instructional outline shown on pages 11-15 of this report.

Each teacher was encouraged to develop and work on projects and instructional devices which would be appropriate for future use with his own students in the school in which he was teaching.

As a part of the required reports each instructor was required to prepare an instructional analysis of those projects which had been worked on to better recognize and anticipate the needs and problems of his blind students.

Experimental Special Education Laboratory

This course was organized as a laboratory school situation where the industrial arts instructors were divided into teams of three and assigned to a blind student for approximately three weeks to present an organized sequence of instruction in one of the areas of wood, metal, electricity, and transportation. Each team covered a broad range of instructional topics in the area similar to the range of topics covered as outlined in detail in the workshop report of last year. Tape recorded information, brailled texts and instructor prepared brailled outlines and diagrams were utilized extensively.

Each instructor and each blind student was rotated to a new area of instruction during the second three weeks to provide as broad an experience as possible for both instructors and students.

The first week in this course was devoted entirely to a demonstration of instructional procedures and a discussion of instructional methods to be used. The instructor teams also utilized this period to plan and develop the organized instructional sequences to be followed with each student.

This proved to be one of the most valuable and worthwhile changes instituted in this year's program.

Each blind student was encouraged to select and plan a project of real interest to himself for construction during this period. The instructors assisted in the direction of choice to insure a broad series of experiences encompassing both hand and power machine operations with adequate opportunities for related instruction having to do with selection of materials, occupations, and other related information essential to the student's understanding.

A total of over 185 separate instructional topics were presented and evaluated by the instructors working with the blind students during the six week period. A complete record of these evaluations are being submitted as a separate part of this report for reference if desired.

Each team rotated the daily responsibilities of teaching, observing and recording among the members of the group. The recorded observations and critique of instructional techniques and problems proved a most effective means of focusing attention in each day's instruction.

Special Education Seminar in Industrial Arts Education

This course was organized on a seminar basis to cover the basic historical, philosophical, and psychological basis of industrial arts with special emphasis on the problems of education of the blind. Special problems were selected for individual and committee research. Outside consultants came from various agencies and from the Department of Special Education of Syracuse University to develop a broad acquaintance with special problems of educating the blind.

Such topics as shop planning and equipment selection, evaluation, counseling, and guidance of the handicapped and integration of the blind with sighted classes were dealt with during the seminar. Special attention was

also devoted to problems encountered in instructing the blind students in the Special Education activities laboratory as they arose.

Several factors combined to make the seminar one of the areas of the workshop which needs to be revised somewhat in next year's program. (Note: see suggestions on pages 32 and 33).

Allen (1)
Feirer-Metal (2)
Feirer-Wood (3)
Marcus (4)

LESSON TOPICS for Week of July 10 - 14

Day	Time	Demonstration or Topic	Instructor & Location	Reference
Monday July 10	8:00	Sheet Metal Cutting	Somerville	pp. 135-165 (2)
	9:00			
	10:00			
	11:00	Use of Table Saw	Pfund	pp. 194-202 (3)
	Seminar	Analysis of Objectives	Phallen	
Tuesday July 11	8:00	Sheet Metal Forming	Somerville	pp. 135-165 (2)
	9:30	Ind. Arts Transportation	Allen-Trans.	(1)
	10:00			
	11:00	Basic Electricity	Pfund	Chapter 1-4 (4)
	Seminar	Def. Function and Scope-I.A.	Phallen	
Wednesday July 12	8:00	Electric Meter	Somerville	Chapter 6 (4)
	9:30	Ignition System - Theory	Allen-Trans.	Chapter 4 (1)
	10:00			
	11:00			
	Seminar	Understanding Industrial Arts	Phallen	
Thursday July 13	8:00			
	9:30	Electric Apparatus	Vargo General Shop	
	10:00			
	11:00			
	Seminar	Ind. Arts in School Programs	Phallen	
Friday July 14	8:00			
	9:30	Crowe Electric Apparatus	Vargo General Shop	
	10:00			
	11:00			
	Seminar	Problems of Partially Sighted	Bertram	

Allen (1)
Feirer-Metal (2)
Feirer-Wood (3)
Marcus (4)

LESSON TOPICS for Week of July 17 - 21

Day	Time	Demonstration or Topic	Instructor & Location	Reference
Monday July 17	8:00	Basic Lathe Operations	Somerville 302	pp. 293-298 (2)
	9:30	Use of Manufacturer's Manuals Make feeler gauge for plugs and points	Allen-Trans.	p. 71 (1)
	10:00			
	11:00	Spot Welding	Somerville 302	pp. 266-267 (2)
	Seminar	Function & Scope of I.A. Progress	Phallen	Chp. I, II, III - Wilber
Tuesday July 18	8:00	Basic Lathe Operations	Somerville 302	pp. 293-298 (2)
	9:30	Automobile Distributor Service Jointer	Allen-Trans. Somerville	Unit 13-p.73 (1) Text (3)
	10:00			
	11:00	Methods of Producing Elect.	Pfund 302	Chpt. 11-12 (4)
	Seminar	Overview of Spec. Educ. Field	Dr. Lee	
Wednesday July 19	8:00	Oxy-Acetylene Welding	Somerville 302	pp. 253-259 (2)
	9:00			
	10:00			
	11:00			
	Seminar	Mobility & Cane Travel	Russ Williams	
Thursday July 20	8:00	Parallel & Series Circuits	Pfund - 302	pp. 39-50 (4)
	9:30	Spark Plug Service Thickness Planer	Allen-Trans. Somerville 302	Unit 14-p.75 (1) Text (3)
	10:00			
	11:00			
	Seminar	Evaluation of Student Progress	Phallen	Text Chpt. XIX
Friday July 21	8:00	Sheet Metal Fasteners	Somerville 302	p. 162 (2)
	9:30	Engine Timing	Allen-Trans.	Unit 16-p.80 (1)
	10:00	Hand in projects, plans and project analysis	Somerville 302	
	11:00			
	Seminar	Evaluating Results in Ind.Arts.	Phallen	Text Chp. XIX

Allen (1)
Feirer-Metal (2)
Feirer-Wood (3)
Marcus (4)
Wilber (5)

LESSON TOPICS for Week of July 24 - 28

Day	Time	Demonstration or Topic	Instructor & Location	Reference
Monday July 24	8:00	How to Use Portable Electric Router	Somerville 302	
	9:30	Compression Checking	Allen-Trans.	Unit 6-P.33 (1)
	10:00			
	11:00	Measuring Electric Pressure, Resistance and Current	Pfund-302	Chp. 3&6 (4)
	Seminar	Principles of Lab. Planning	Phallen	Chp. XVII (5)
Tuesday July 25	8:00	Continuity Testing-Rectifiers-Fuses	Pfund-302	pp. 165-177 (4) 261-264
	9:30	Fuel System Service	Allen-Trans.	Unit 8-p.48 (1)
	10:00			
	11:00	Grinding Lathe Tool Bits	Somerville 302	pp. 281-283 (2)
	Seminar	Laboratory Planning	Phallen	Chp. XVII (5)
Wednesday July 26	8:00	Metal Shaper	Somerville 302	pp. 298-304 (2)
	9:30	Season Care & Major Tune-up of Automobile	Allen-Trans.	Units 25-26 p. 140 (1)
	10:00			
	11:00			
	Seminar	Preparing Braille Instructional Material	Napier	
		Attitudes of Blind Children	E. Rowe	
Thursday July 27	8:00	Working with Wire	Pfund-302	
	9:30	Front Wheel Bearing Service	Allen-Trans.	p. 138 (1)
	10:00			
	11:00	Simple Heat Treating	Somerville 302	pp. 227-233 (2)
	Seminar	Integrating Blind Children-Classroom	Chandler	
Friday July 28	8:00	Spinning Lathe	Somerville 201	pp. 210-215 (2)
	9:30	Oil Filters, Air Filters, Oil Change & Chassis Lub.	Allen-Trans.	Unit 24-p.135 (1)
	10:00			
	11:00			
	Seminar	Laboratory Planning	Phallen	Chp.XVII-XVIII(5)

Allen (1)
Feirer-Metal (2)
Feirer-Wood (3)
Marcus (4)

LESSON TOPICS for Week of July 31 - August 4

Day	Time	Demonstration or Topic	Instructor & Location	Reference
Monday July 31	8:00	Communications-History of	Somerville 302	Elements of Radio - Marcus
	9:30	Small Engine Magneto Ignition System-Theory and Service	Allen-Trans.	
	10:00			
	11:00			
	Seminar	Lab Planning, Size, Shape, and Arrangement, etc.	Phallen	
Tuesday August 1	8:00	Radio-The Aerial Ground System	Somerville 302	Elements of Radio - Marcus
	9:30	Small Engine Tune-up & Presentative Maintenance	Allen-Trans.	
	10:00			
	11:00	Milling Machine	Greer-201	pp. 305-312 (2)
	2:30-4:30 Seminar	I.A. for Elementary Grades Joint Seminar with Syra.Univ.	Pfund	
Wednesday August 2	8:00	Radio - The Tuner	Somerville 302	Elements of Radio - Marcus
	9:30	Outboard Engine Seasonal Care	Allen-Trans.	
	10:00			
	11:00	Copper Enameling	Pfund	
	Seminar	Eval. of Indiv. Lab. Planning	Phallen	
Thursday August 3	8:00	Radio - The Detector	Somerville 302	Elements of Radio - Marcus
	9:30	Bicycle Care and Service	Allen-Trans.	
	10:00			
	11:00	Copper Foil Work-Flocking	Pfund	
	Seminar	Depth Study Problems-Reports	Phallen	
Friday August 4	8:00	Radio - Reproducer	Somerville 302	Elements of Radio - Marcus
	9:30	Supervised Work Period	Allen	
	10:00			
	11:00			
	Seminar	Depth Study Problems-Reports	Phallen	

LESSON TOPICS for Week of August 7 - 11

Day	Time	Demonstration or Topic	Instructor & Location	Reference
Monday August 7	8:00	Supervised Work and Individual Instruction	Somerville Pfund	
	9:00			
	10:00			
	11:00	Adapted Tools for Blind	Voorhies	
	Seminar	Future Vocational Choice- Holmes and Thrun	Voorhies	
Tuesday August 8	8:00	Supervised Work	Somerville Pfund	
	9:00			
	10:00			
	11:00			
	Seminar	Metal Equipment-Hamilton,Allee Test Facts & Prin.-Lawson		
Wednesday August 9	8:00	Supervised Work	Somerville Pfund	
	9:00			
	10:00			
	11:00			
	Seminar	Wood Equipment-Sowell,Spear Evaluation Problems-Myers, Orsak		
Thursday August 10	8:00	Exam	Somerville	
	9:00			
	10:00			
	1:00	Evaluation	Hastings	
	Seminar	Final Evaluation	Phallen	
Friday August 11	8:00	Completion Records, Reports and Projects		
	9:00			
	10:00			
	1:00	Workshop Evaluation	Hastings & Staff	

Teaching Suggestions and Guides

The seminar discussion based on individual and committee research on specialized problems and topics related to the instruction of the blind resulted in the development of a condensed set of guiding principles and suggestions for use by instructors in the teaching of blind students. These principles and guides are being made a part of this report for reference purposes.

Summary Proposals and Recommendations for Teaching Industrial Arts to Blind Students

1. Industrial Arts in General Education, not vocational.
2. The six basis objectives of industrial arts are:
   a. To develop in each pupil an insight and understanding of industry and its importance in our culture.
   b. To discover and develop talents of students in the technical fields and applied science.
   c. To develop technical problem-solving skills related to materials and processes.
   d. To develop in each pupil a measure of skill in the use of common tools and machines.
   e. To provide the student with a breadth of experience which he may use as a basis for future educational and vocational choice.
   f. To enable each student to achieve a degree of self realization from the creative manipulative experience provided.
3. Industrial arts should be made available at the elementary and secondary school level and at the adult level.
4. The source of subject matter for industrial arts is industry itself.
5. In teaching industrial arts, opportunity should be provided for students to do individual and group projects, participate in line production projects and do experimentation and research work. The emphasis, however, must be on the learning experience involved and not on the finished product.
6. The students should gain a degree of proficiency in the use of common tools, machines, materials and the language of <u>several</u> basic industries.

7. Industrial arts on the elementary level utilizes the facilities and the teacher of the elementary classroom in integrating industrial arts activities with general education subjects.
8. Industrial arts on the junior high school level should provide exploratory and guidance values.
9. Industrial arts on the senior high school level, while considered primarily as general education and valuable to all students preparing to live in our industrial technical culture, provides for a concentration of subject matter to prepare students for industrial education centers, for industrial-vocational courses or for engineering.
10. Industrial arts on the adult level helps to provide hobby and leisure time interests.
11. All industrial arts programs should make provision for and be challenging to both the bright students and the slow learner.
12. The nature of the industrial arts program and the subject matter taught must be determined by the stated objectives and not by the special interests and abilities of the teacher.
13. Textbooks should be used and outside assignments made for all industrial arts courses.
14. Cooperative activities between the industrial arts department and other departments of the school are desirable and should provide desirable learning experiences for the students.
15. Industrial arts should not be considered primarily as a feeder for vocational education but for the blind student it should serve a most valuable purpose of preparing students to profit from vocational rehabilitation services.
16. Emphasis should be placed on the inventive and problem solving activities of industrial arts.

17. More emphasis should be placed on individual planning and design and less on copy work.
18. One unit of industrial arts should be required of all students on the junior high school level.
19. It would be better to close an industrial arts shop than to employ a teacher who is not technically and philosophically competent.
20. The individual project method of teaching should be supplemented with a variety of other teaching techniques.
21. Group teaching can be organized more efficiently around a group project for beginning students than through the use of individual projects.
22. Beginning students in industrial arts need not be confined to the learning of basic hand tool processes before learning machine processes.
23. Separate and different industrial arts courses should be provided for the superior student.
24. Special courses in industrial arts should be provided for the slow learner.

Suggested Woodworking Teaching Techniques for Blind Students

1. The 4 point safety pattern should be reviewed and each students made aware of it for each new machine to which he is introduced.
2. Students should be made aware of the location and nature of the cutting edge or dangerous part of any tool or machine when first introduced to it.
3. Make adequate marks with scratch-awl for student to follow in measuring and laying out. Scratch marks should be used rather than a dot only when scratch mark will be cut away.
4. A small notch may be used on edge of work to mark location for starting a cut.
5. Student should be introduced to simple drawings by means of raised line drawing kit as soon as possible to get him used to reading a plan.
6. The student should be taught to identify woods by smell, feel, density and weight.
7. Rub-on fast drying finishes such as Seal-o-cell are more practical than brush-on finishes.
8. Templates of plywood or sheet metal may be used whenever duplicate parts need to be made.
9. Safety zone markings of abrasive tread material should be placed on the floor around all machines and their use strictly observed. (Minnesota Mining and Manufacturing Company pressure sensitive adhesive backing).
10. Blind students should be thoroughly acquainted with all braille tools and these tools used extensively in teaching students to work with hand tools.

11. A feather board should be used whenever possible when operating the circular saw for holding work in position.
12. The wood lathe tool rest should have stops attached to the ends or adjustable metal pins to limit the travel of the turning tools.
13. All tools should be kept sharp for safety and because the blind student cannot see damage done by dull tool.

Suggested Transportation Teaching Techniques for Blind Students

1. Cut-aways and mock ups of all types of components on the automobile and small engine are essential to teaching the student the parts of the automobile.
2. A thorough orientation to all the component parts of the automobile and engine and their relationship to each other is essential before attempting to teach the student about various parts of the automobile.
3. Ignition - In the checking point gap the knife or blade type feeler gauge is easier for the student to use than a wire feeler gauge.
4. Assembling an ignition system using a dry cell battery, coil and distributor is an effective teaching device for teaching the ignition system.
5. Students can be taught to clean and gap spark plugs but we do not have an effective device adapted for telling when the plug is clean. The wire feeler gauge is used in checking gap on the plugs.
6. Students can effectively tear down and reassemble small motors (one and two cycle) in one day. To assist the student in keeping parts separated and in order a compartmented cupcake tin might be used. The student should be taught to place parts in separate compartments as they are removed. When reassembling they can be removed from the compartments in reverse order.
7. In working on jobs or problems students may work in teams of one to three. It is better if they work alone if there are enough separate jobs. If there are partially sighted students in the class, place a partially sighted student with a totally blind student to work.
8. Students should be encouraged to use a normal working posture so that they develop stance, stability and comfort while working in handling tools and parts.

9. Compression checks can be performed by adapting a standard gauge so that it can be read by feel by removing cover glass.
10. Setting of tappets can be performed with the motor running (hot setting) or with the motor cold by using a jumper lead to the battery to turn the engine over.
11. Bicycle work can be performed satisfactorily by blind students but it is desirable to have a partially sighted or sighted person work with the student.
12. In checking timing on an engine cellophane can be placed between the points and the distributor rotated until the points open and the cellophane can be pulled out.
13. Start outboard motor and small engines and allow students to run and adjust carburetor settings to develop interest.
14. When student works on parts of engine on a bench make sure parts are anchored on a base or placed in a vise to enable student to concentrate on what he is doing rather than on holding parts in position.
15. Have a work table with a well in the center to collect all pieces which might drop or roll off the bench and get lost. Other means might be the use of a magnetic table top or a cloth or canvas apron to catch small parts.
16. Tire changing is a reasonable and simple operation that can be performed by a blind student.
17. In providing orientation to the automobile place a car on a hoist and allow the student to become familiar with the underside of the car.
18. Adjusting automobile brakes can be done very satisfactorily if student is made familiar with auto brake assembly by use of cut-away or mock-up first.
19. It is important to have a mock-up or cut-away of the principal parts of the automobile and engine if the student is to be able to understand their operation.

Suggested Metal Teaching Techniques for Blind Students

1. When teaching cutting sheet metal with snips, scribe metal heavily so student can feel line with snips or finger nail. Nich edge metal to locate starting point if needed.
2. Perforated sheet metal is a good material to use for early experience. The pattern is useful in guiding cuts and provides decorative appearance.
3. Notches cut at each end of metal on layout line are an aid in cutting sheet metal on squaring shears.
4. A raised line drawing of the sheet metal layout enables the student to find out what the pattern will look like.
5. Soldering can be performed more readily by use of electrical soldering iron or soldering gun depending on size of job and thickness of metal.
6. Soldering with propane torch is practical with some practice. Torch with button valve is recommended. Student should orient himself to joint with unlit torch for practice.
7. The end of a soldering gun may be wrapped with asbestos rope to reduce student's fear of burns but he should be taught to use soldering gun in normal manner if possible.
8. Spot welding is an ideal method for joining sheet metal and light weight wrought iron.
9. Table model hand operated sheet metal shears are easier for the blind student to use and operate than the floor model foot operated models.
10. The braille rule is most effective in layout work on sheet metal. Used mainly on flat work.
11. Introduce student to the metal lathe and show student the main parts of the machine with the motor off. Instructor should mount work in lathe for student as an introduction to what it does.

12. Start student on the lathe by using horizontal cuts with the apron hand wheel used manually.
13. Bending wrought iron to a 90° angle may be accomplished by bending metal in a vise with the metal parallel to the top of the vise jaws and using side of vise for squaring off bend.
14. All wheels on the lathe or any machine can be operated more effectively when the student understands one complete turn of the wheel is one hour on a clock, 1/4 turn being 15 min. on a clock, etc. Also he should know the amount of travel of one complete revolution.
15. If repeating a certain cut on the lathe or milling machine it is advantageous for the student to count the number of revolutions of the apron hand wheel to find his starting and stopping points.
16. When working on the metal shaper the student can understand better the operation of the machine and can more easily tell the progress if he keeps one hand riding safely on the clapper-box and the other hand on the clutch.
17. Finish cuts and adjustment of the tool cutter on the shaper and milling machine can be determined by use of paper between work and tool bit.
18. The student should become familiar with the sounds and vibrations of a normal operating machine and be ready to stop the work immediately when a drastic change takes place.
19. When setting a cutting tool for lathe work, it is much easier if student uses the dead center on tail stock to adjust tool on center.
20. When using the bar folder, the way to measure depth of fold is by making trial folds measuring them, and then adjusting machine to proper setting.
21. Student should keep scrap metal clear of all working surfaces as soon as metal is cut. This can be done easily if the teacher attaches a scrap bin to sheet metal benches.

22. Putting a stopping block on the lathe bed for making horizontal cuts will prevent the student from running cutting tool into the lathe chuck.

23. Aviation type sheet metal snips are easier to use and more practical than straight tinners snips.

Suggested Electricity Teaching Techniques for Blind Students

1. Know the color code for resistors. The student needs this information as a basis for electronics.
2. Arrange spools of hook-up wire in color code so student can easily select the color wire he is to use.
3. Stress importance of exactness to the student. Proper connections and tight windings are necessary to achieve success.
4. Complicated coils should be bought. Don't waste time winding big coils, however, a student should be taught to wind a simple coil. One of the easiest to wind is a crystal coil (about 150turns on $1\frac{1}{2}$" tubing).
5. Create situations which cause questions to arise in the student's mind. They may be answered as the student works on his experiment or project.
6. Have at least 2 sets of 2000 ohm highly sensitive and if possible 3 sets of head phones. One 102 impedance 1,000 ohm or 2,000 ohm - 1 high impedance (crystal earphone).
7. Formvar (GE) wire should be purchased for winding coils. With ordinary enamel covered wire the insulation breaks off in process of winding and unwinding.
8. Use a crystal set in good working order so that the student may follow plans to a successful experience. This means a good aerial and ground as well as head set.
9. When building a crystal set with a loop stick, use approximately 10-20 turns of #20 plastic insulated wire wound over the loop stick with ends hooked to aerial and ground to improve selectivity and sensitivity. Wound coil over loop stick increases selectivity.
10. When explaining a transformer have a small one that works a buzzer for sound or a light bulb that heats up enough for the student to feel.

11. Use bases to mount all materials on whenever possible. When using circuits it is necessary to have components firmly mounted so the student can trace the circuit without pulling connections apart or tangling them. Standard connections should be used.
12. Instructor should check all soldered joints. Beware of cold soldered joints and poor connections.
13. When soldering, try to assemble and solder as many joints as possible before placing them into complicated areas like radio chasis.
14. Purchase an audio circuit analyzer as soon as possible. Let the student test as many things as possible (even body resistance).
15. Success is one of the best drivers. Let the student gain confidence in his work by experiencing success with his first experiments work from the simple to complex.
16. A mock up board showing the various means of producing electricity, electrolitic, magnetic, heat, etc., is most useful in explaining electricity to the beginner.
17. Shock hazard can be minimized by touching only one wire at a time.
18. Erectronic Kit L-100W (Science Electronics Inc.) is a durable commercial kit for use in teaching principles. Needed units can be made - good project.
19. Component parts mounted on peg board bases enables students to assemble simple circuits and test operation without wasting time on construction problems.
20. Circuits using lights for resistances should have buzzers or other auditory devices substituted.
21. Electrical symbols or braille labels should be made large for identifying parts of a circuit when using the raised line kit for drawing schematics.

22. Beginning students in electricity should mount components on one side of a base and do all wiring and soldering on the same side in the case of small radios, etc.
23. In making small radios use of sheet plastic or metal which can be bent perpendicular to form a panel for mounting control knobs, switches, etc. enables the student to confine wiring and work to one surface.
24. A parts compartment to hold various small parts of a project can be of help to the student to keep track of pieces.
25. If student is wiring a particular project he should be taught to cut the wire from the spool as he needs it rather than pre-cut several wires at once.
26. Solder lugs should be used in conjunction with fahnestock clips for ease in making solder connections.
27. Students should be taught to arrange his tools in an orderly manner at his work station to avoid confusion and the danger of injury or burns when working in electrical area.
28. When using resistors, the leads should be shortened before they are inserted into position for soldering.
29. Small fahnestock clips should be used when mounting transistors. If mistakes are made they can be easily remedied by moving the leads on the transistor.
30. Wire strippers that can be set for size are better than those with no adjustment for size.
31. Students should be taught to use a braille drawing of the schematic diagram of an electrical circuit as a reference to guide them in their work.
32. Tape recording of related information to brief a student on material or work to be accomplished the next day. Such topics as transistors, theory or radio, etc. are most useful.

Part III

Workshop Evaluation

A true evaluation of a workshop of this nature is best reflected in the results produced in the industrial arts program in the resident schools and public schools represented by the instructors who participated.

Periodic evaluation of any program from a short range view however, can be most beneficial. The workshop program as conducted and outlined in this report was evaluated by the staff and participants at two different points - once at the midpoint and again at the end.

The midpoint evaluation was useful in making minor adjustments in the instructional sequences and as a means of determining if the participants were adequately realizing the objectives which they had hoped to attain. Over-all objectives of the program were again considered to determine if the workshop was progressing in the right direction.

The major aspects of the workshop were again evaluated at the end of the session. The following summary statements reflect the general evaluation of the program by the staff and participants.

1. General orientation and publicity - all participants were in accord that the program was well defined to them and the purposes and objectives together with the procedures to be followed in reaching these objectives were definite and consistant with their needs. All expressed the feeling that the realistic approach outlined both in the brochure and in the early orientation sessions was well directed to their needs and established a good focus for their work during the six weeks. Several members expressed a desire that future participants be sent advance information on the workshop by March 1 to enable teachers desiring to attend the workshop to make definite

plans to do so before making other commitments.

2. Objectives of the program - all participants and staff felt these were realistic and well within the range of what could reasonably be achieved within the limits of the workshop. Some felt there was possibility for more individual or small group research which might be accomplished in conjunction with what was being done but agreed that this objective should not supplant the major training objective unless this were recognized as a separate function to be performed by the workshop. This holds some very real possibilities for the future.

3. General organization - The pattern used during the past two years is generally very satisfactory and provides an excellent balance of time and emphasis to accomplish the objectives for which the program is being offered. Many of the participants would like a larger amount of time devoted to the demonstration teaching and the evaluation of instruction with the blind students if this could be accomplished without sacrificing time in other areas of the program. No one expressed any feeling that any portion of the present workshop pattern should be eliminated.

4. Participants and students - Considerable attention was devoted to this phase of the program and it was generally felt that the ratio of 15 instructors and 5 blind high school students for laboratory teaching was a very satisfactory ratio. It was also felt that more than 15 instructors should not be admitted in view of the wide range of background and needs represented in any such group. Effort will again be made to include one or two blind students from public schools in future programs.

5. Texts and reference materials - General Satisfaction was registered with all text and reference materials made available and used as a basis for the various portions of the workshop. Lack of brailled text materials suitable for high school students' use was generally recognized as a seriously limiting factor in the effectiveness of instruction to the blind students. This is a major deficiency which needs to be overcome by the early production of more braille texts in the field of industrial arts.

6. Consultants - Several of the workshop participants and some members of the staff were somewhat disappointed in the value derived from certain outside consultants. This was primarily due to the fact that although several of the consultants were from the field of special education their experience had been with an elementary grade level of students and therefore they seemed unable to adapt their material and information for use by industrial arts teachers at the junior and senior high school level. All expressed complete satisfaction with the consultants from the field of industrial arts who were used and felt these specialists made a most effective contribution.

CONTENT

7. Technical laboratory - All participants were able to increase their technical competence in at least two areas of work through the provision of a wide range of instruction. Provision was made for those who could profit, to participate in a graduate course in electronics while other teachers were given only basic instruction in this area depending upon their needs. Many instructors profited from a well planned sequence of instruction in transportation which

was unfamiliar to most of the people. This phase of the work was evaluated as most satisfactory by all. Each instructor left with increased technical skills and knowledge and also a greater understanding of how various areas of work should be taught and what type of equipment and arrangement was most appropriate for instructional purposes.

8. Special Education Activities Laboratory - The laboratory school situation proved to be extremely beneficial to all instructors. The teaching provided opportunity for each individual to present instruction using several different approaches and aids and to critically observe and evaluate the teaching of others. Most of the participants expressed a desire to see this phase of the workshop enlarged. One area of weakness existed in that there was not enough time to adequately summarize and critique the various teaching problems encountered. This will be overcome by re-scheduling the time in this part of the workshop another year.

9. Seminar - The individual and committee research together with the instructor lectures were instrumental in enriching the participants' concepts and philosophy of industrial arts education for the blind. Difficulty was encountered in trying to focus the discussions toward both the general principles of industrial arts and the specific application for instructing the blind. Extensive use of consultants on the special education phases of the workshop was made during the seminar with only average success and results for the reasons mentioned previously.

GENERAL

1. There is extensive value in having the general student body of the college and the college staff observe the work and progress of the blind students and their instructors. This created a general awareness of the capabilities of the blind and a better understanding of what can be accomplished by blind people.
2. Instructors who had not taken college work in some time were refreshed in their outlook, were made aware of recent trends in industrial arts, and gained a better concept of the need for well planned instruction with definite objectives.
3. The workshop participants increased their abilities and techniques of teaching through continued evaluation of their own and the teaching of others. As a result they became better able to anticipate the instructional needs of students.
4. Through observing and at times participating in the recreational program and mobility training of the blind students the participants were made aware of the importance and need for recreational activities and mobility training of blind students.
5. Involving different agencies and organizations in the planning and conduct of the workshop such as the American Foundation for the Blind, the American Association of Instructors of the Blind, the New York State Department of Social Welfare, and the New York State Education Department has helped all concerned to realize that there are many agencies which cooperate in solving problems pertaining to the education of the blind. This process has also made many more people increasingly aware of the vocational rehabilitation values gained through good industrial arts experiences for blind students.

Part IV

Recommendations

The following recommendations are submitted for improving future workshops for industrial arts teachers of the blind and for the improvement of instruction of blind students in industrial arts.

1. This workshop training program for industrial arts teachers of the blind should be continued in view of the widespread need for this type program. To date only 21 instructors from 18 of the 50 resident schools have been enrolled. There is a pressing need to orient the vast number of public school industrial arts teachers who will be teaching blind students in approximately 450 school systems.
2. The workshop should be structured and conducted in essentially the same form as in the past two years. Technical laboratory 4 hours; special education laboratory 2 hours; seminar 1½ hours.
3. The following basic texts should be produced in braille as soon as possible for general use by industrial arts students:

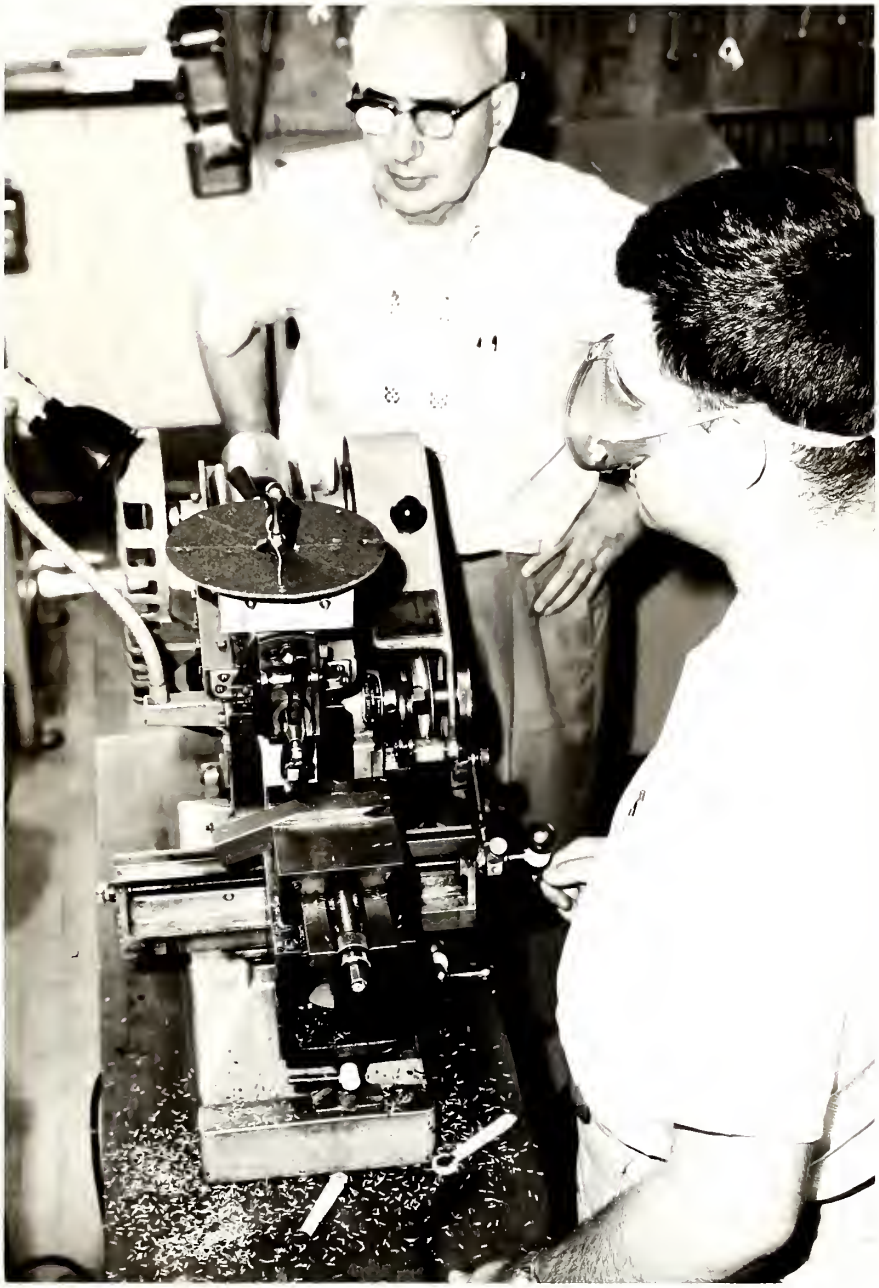
   Allen, Willard A., Know Your Car, Chicago: American Technical Society, 1960.

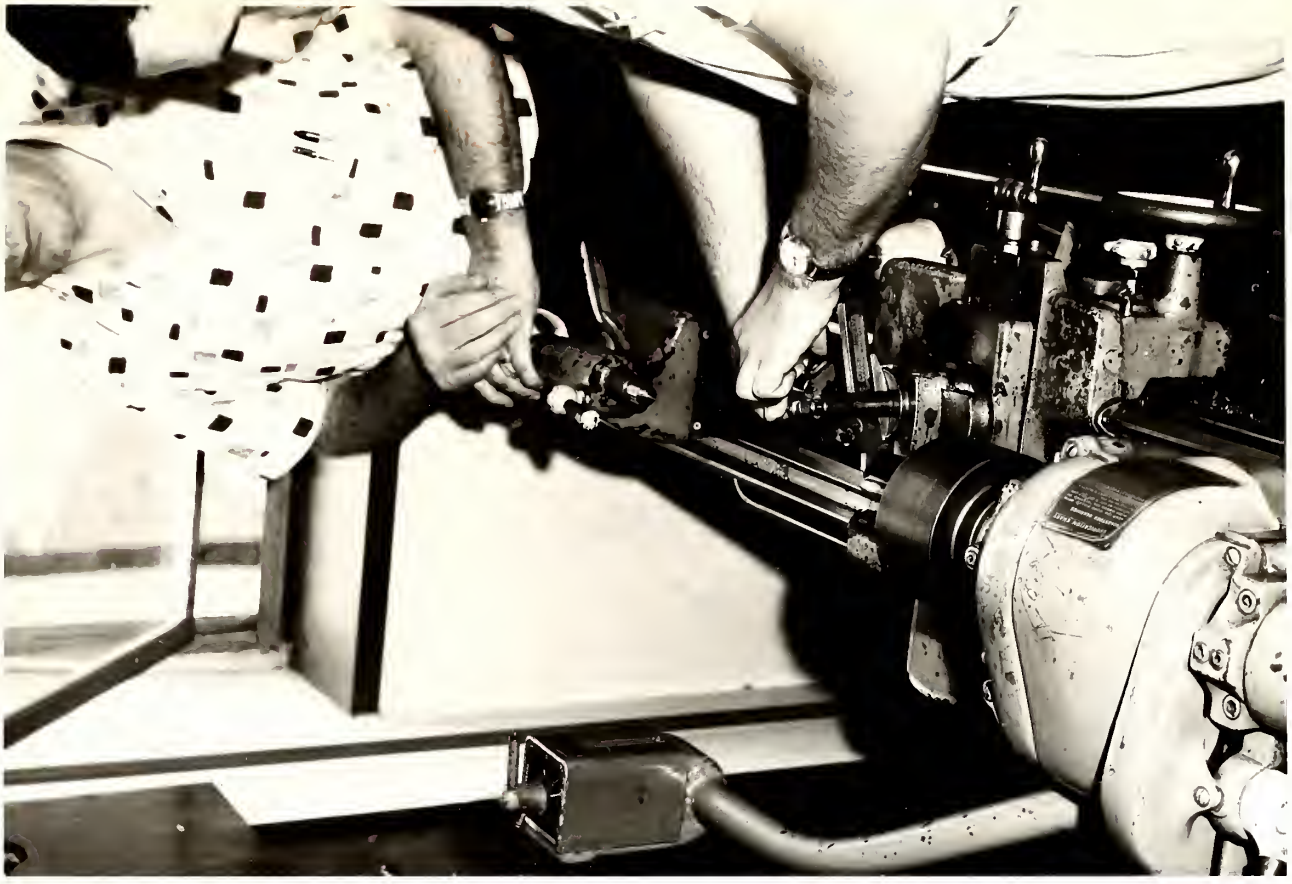
   Feirer, John L., General Metals, New York: McGraw-Hill, 1959

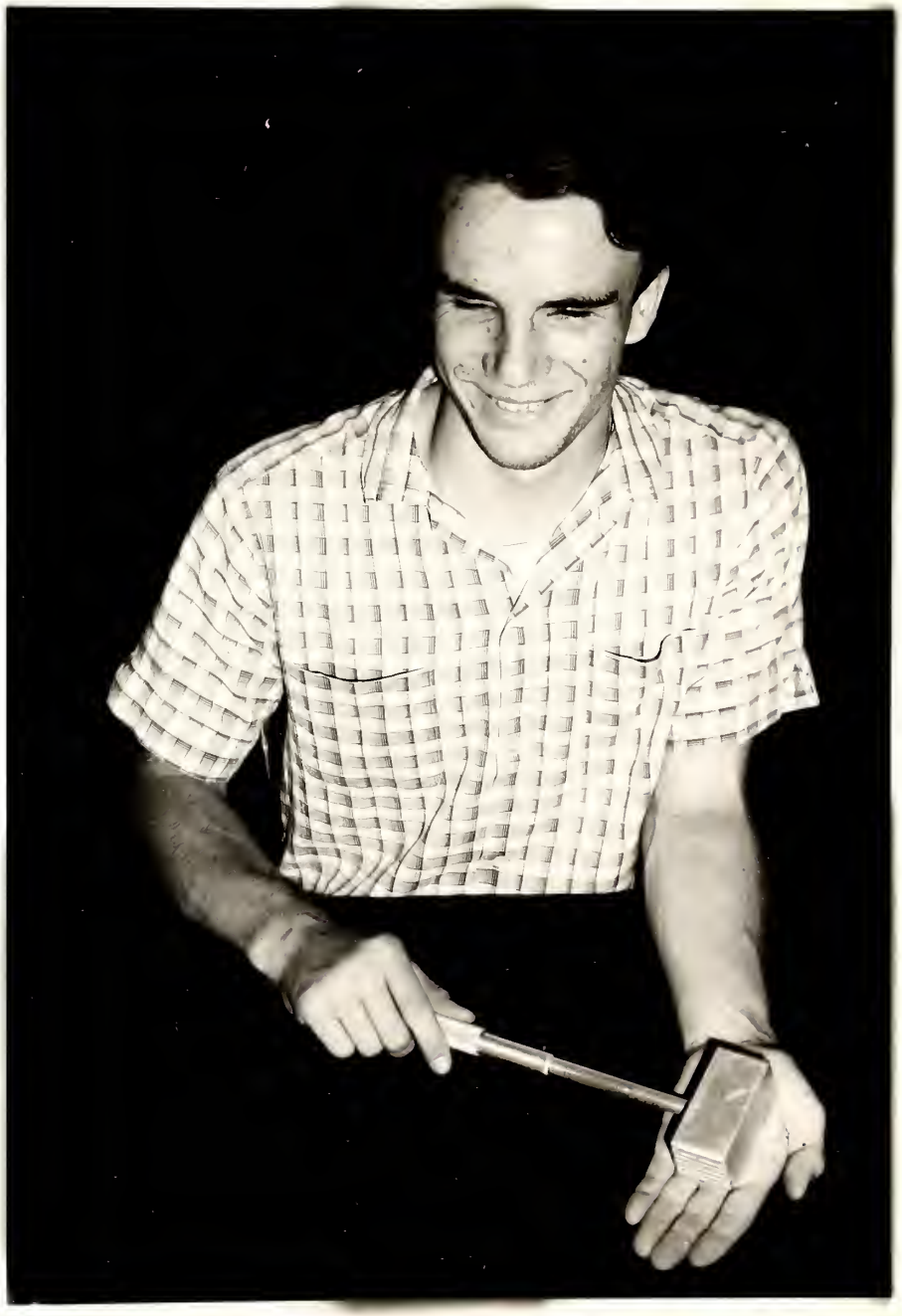
   Stienberg, W. B., Ford, W. B., Electricity and Electronics, Chicago: American Technical Society, 1957

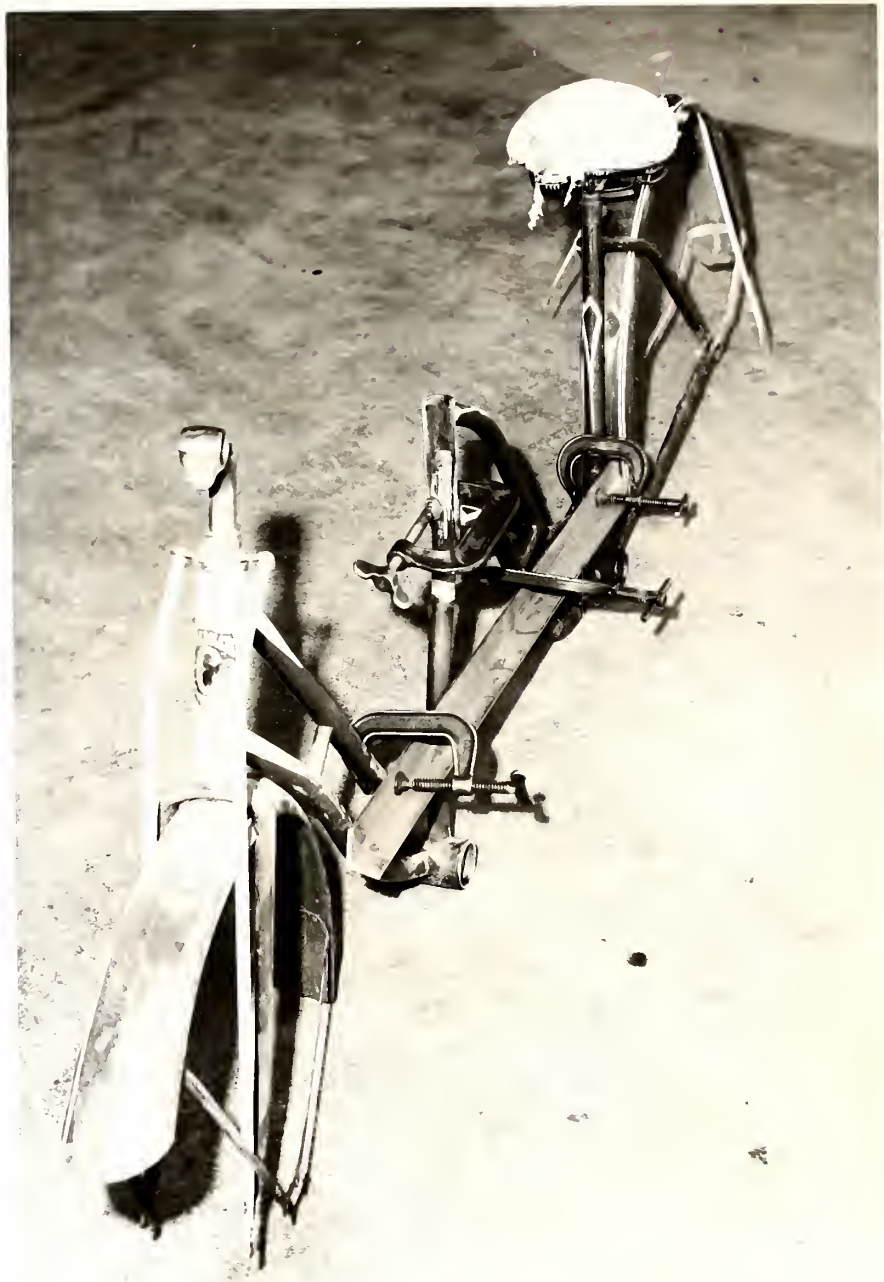
4. Short units of related instruction information should be produced on tapes to supplement the above texts. These units should be about 20 minutes in listening time.
5. Further research and experimentation needs to be conducted in the area of drawing and planning in order to develop tools, materials, and teaching techniques appropriate for use by the blind.

6. Additional tools, instruments and texts need to be developed and adapted for use by the blind in the field of electricity and basic electronics.
7. Administrators of resident schools and public schools where there are blind students enrolled who would profit from an enriched program of industrial arts should encourage industrial arts teachers in their system to apply for this workshop.
8. Serious consideration should be given to the extension of this workshop program to provide for some basic research and development in the area of teaching aids, devices, and instructional materials for use in industrial arts and vocational classes.
9. Early determination should be made regarding the continuance of this workshop in order that the most competent staff can be obtained and in order that sufficient advance notice may be sent out so that personnel most eligible can be enrolled in the program. This information should be made known by January 1, 1962.





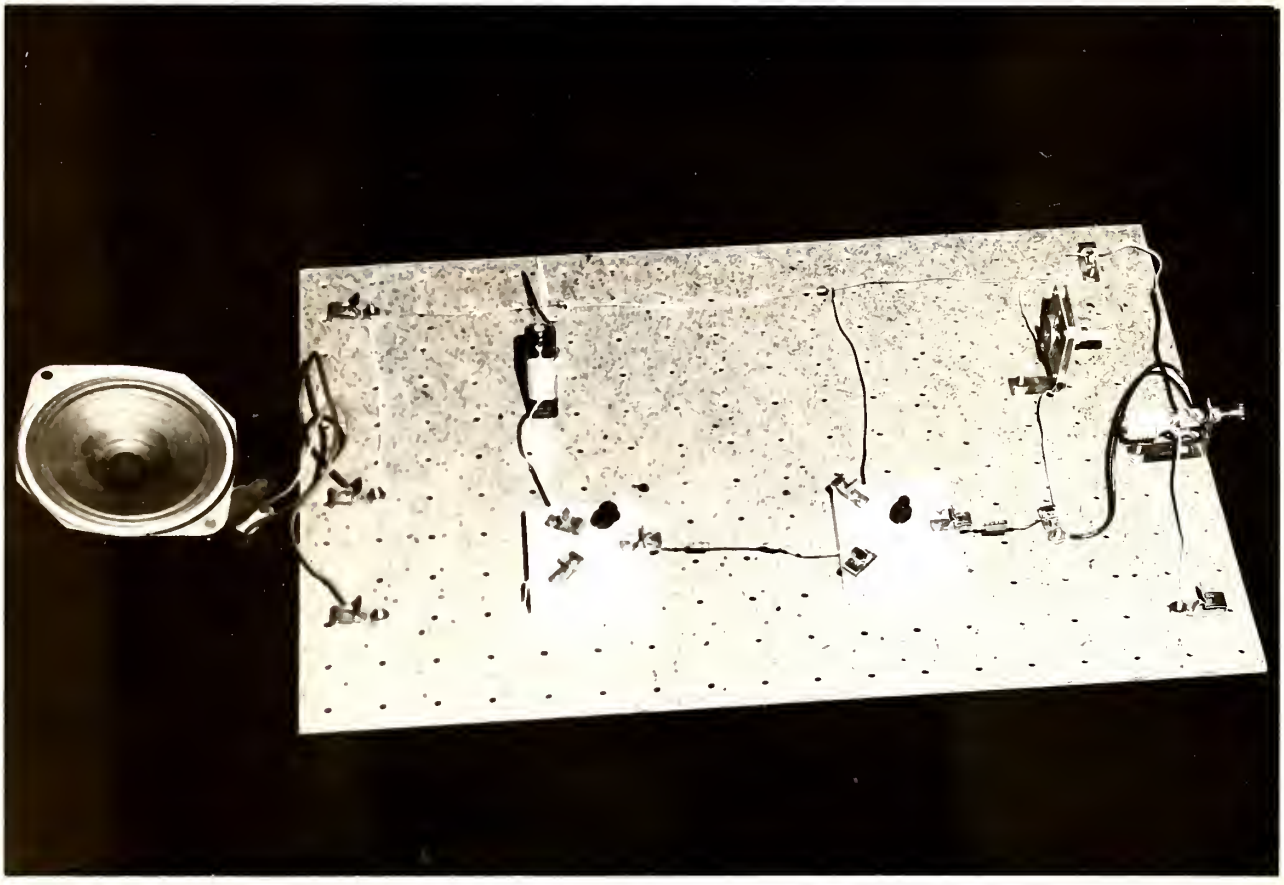




TOOLS
ADAPTED FOR USE BY
BLIND STUDENTS.

HV1658 c.1
H
Hastings, James R.
Summer workshop for industrial
art instructors of the blind. 1961.

Date Due			



SUMMER WORKSHOP

FOR

INDUSTRIAL ARTS TEACHERS
OF THE BLIND

SUPPLEMENTAL REFERENCE MATERIALS

OVR 240-61

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AMERICAN FOUNDATION
FOR THE BLIND INC.

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SUPPLEMENTAL REFERENCE MATERIAL

SUMMER WORKSHOP

FOR

INDUSTRIAL ARTS INSTRUCTORS

OF THE BLIND

Conducted at
State University of New York
College of Education at Oswego
July 3 - August 11, 1961

TEACHING AND TRAINEESHIP GRANT

OVR 240-61

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[illegible]

[illegible] 225 [illegible]
[illegible] Special Education
[illegible] Laboratory

[illegible]

Course Description:

An experimental special education laboratory course involving blind high school [illegible] in a laboratory school atmosphere. Graduate students enrolled will be expected to select and prepare units of instruction to involve the experimental students in the areas of wood, metal, electricity, and transportation. Experimental teaching procedures will be evaluated and student progress recorded for purposes of making appropriate changes and adaptations in teaching techniques and procedures.

Purpose:

To provide opportunity for the experimental teaching of selected units of instruction in wood, metal, electricity, and transportation. Experimental teaching procedures will be evaluated and student progress recorded for purposes of making appropriate changes and adaptations in teaching techniques and procedures.

Objectives:

1. To provide opportunity for the experimental teaching of selected units of instruction in wood, metal, electricity and transportation.

2. To ascertain the most appropriate techniques and procedures for teaching certain units of instruction.

3. To provide opportunity to evaluate the effectiveness of certain types of instruction for purposes of modifying teaching procedures.

4. To assist in determining the most appropriate teaching content and rate of instruction for the blind high school student of average ability.

5. To provide opportunity for experimental use of certain special teaching devices, tools and aids to determine their values in teaching the blind.

I. Instructional Procedures:

1. Orientation techniques

   a. Shop and work stations
   b. Machines

2. Development of Instructional Sequence

   a. Technical demonstrations
   b. Related information

Anderson, C. A., Bros., Inc., ...

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American Vocational Association, A Guide to Occupations for Counselors in Vocational Education, Washington, D. C., 1951.

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Albany, N.Y., Delmar Publishing, 1950.
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[illegible]

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[illegible]

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[illegible] Activities for Blind Children in Public Schools, [illegible] 1957.

U.S. Department of Health, Education and Welfare, Teachers of Children Who are Blind, Bulletin #30, 1959, Washington, D.C. Government Printing Office.

Course Outline

Course Description:

It is a special elective laboratory course supporting the technical skills of industrial arts teachers of blind students. Special emphasis will be given in the areas of wood, metal, electricity and transportation. The use of tools and crafts will also be included if the need arises. Time will be allotted for the fabrication development of instructional aids for use in the Ohio State Special Education Laboratory School. An opportunity will be provided for the planning and development of individual and group projects suitable for blind school students.

Objectives:

1. To provide industrial arts teachers in the field an opportunity to develop their technical skills in wood, metal, electricity and transportation.
2. To provide an opportunity to develop and prepare teaching aids and instructional devices that will lead to better instruction of the blind.
3. To provide an opportunity to plan and construct projects suitable to give blind students experiences in the basic skills of wood, metal, electricity and transportation.
4. To investigate and develop plans, jigs, fixtures, materials and project ideas that can be used in the area of assembly line production with blind high school students.

Considerations:

1. Provide attendance.
2. Improve skills. (The skill of using the square is used one semester of practical record is determined by the ability of the student that you did in teaching.
3. Develop a project outlook that for each completed problem. (Success will be provided)
4. Plan and maintain an ideal for teaching aims. (Use of bulletin boards, improve interaction in performance of hand projects.
5. Complete all assigned work and information sheets.

Values and Evaluation:

1. Efficient use of time.
2. Intelligent planning.
3. Quality of workmanship.
4. Cooperative effort exercised to make the course a success.
5. Understanding of technology and subject matter as indicated by knowledge

Unit I: Technical Subject Matter

— Processes most appropriate for plan high school students.

Woodworking: Planning and Layout
Sawing
Hand Planing
Shaping
Chiseling
Boring
Sharpening tools
Joinery
Gluing and Assembling
Using Wood Fastenings
Wood Finishing
Using the Jointer
Using the Table Saw
Using the Band Saw
Using the Jig Saw
Using the Wood Turning Lathe
Using the Drill Press
Using the Shaper
Using the Router

Unit 4: Documentation of Class Planning and Group Instruction

- Analysis of need for instruction;
- Using standard specification forms
- Holding Workshop Tools
- Jigs as guides

Unit 5: Development of Special Instructional Materials and Devices

- Manual Task Analysis
- Instructional Data Recording
- Conduct Time Studies in Detail

Unit 6: Related Instruction

- Methods of Teaching Theory Principles and Facts
- Talking Books

Assigned Reading:

Textbook Chapters

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Berger, J. Alden, [illegible] (New York: [illegible], [illegible]).

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Hammond, Thomas D., [illegible] (New York: [illegible]).

Palmer, John, [illegible].

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Uber, Paul B. and Schildkraut, Sid, Basic Electronics (New York: McGraw-Hill, 1950).

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Uber, Paul B. and Schildkraut, Sid, Basic Radio and Radio Receiver Servicing (New York: McGraw-Hill, 1946).

Description: A graduate course covering the basic historical, philosophical and psychological basis of industrial arts with special emphasis on the problems of special education as pertains to industrial arts in the total education program. Specific problems will be selected for individual and committee research utilizing the services of special education and industrial arts consultants in the problem and study of these problems.

Format: Specific course content varies with events in education and the group needs and interest. The text for the course is Wilbur, Gordon H. Industrial Arts in General Education, which every student must have [illegible] in the college bookstore. The text material is augmented by an additional outline, by lectures, investigations, and general supplementary reading. Principal techniques include extensive discussion based upon the text and additional reading, oral committee reports on special topics and informal debates on principal pertinent issues.

Student Assignments: The basic reading requirements are the text and supplied supplemental reading in which each student will be expected to gauge his progress according to class programs. On the attached reading list will be found specific references for each major topic. These have been carefully selected as supplementary material related to the special topics in the course.

It is anticipated that students will encounter many new educational words and terms. The meanings of these terms should be carefully studied from authoritative sources such as Dictionary of Education by Good, 1960.

All reading done for this course, aside from the text, should be listed on the Record of Reading form provided. An annotated report should be submitted for each reference read. These annotations should include (1) a brief statement of the content, (2) a list of the "key points", and (3) a short statement of personal comments or reactions. The number due each week will be indicated by your instructor. See sample annotation.

Evaluation: Most students enrolled in this course are just beginning graduate work. The course is therefore an opportunity for each student to evaluate himself as regards his capabilities for graduate work and as regards his promise as a potential "Master Teacher". Clues to the criteria for judgment can be gained by reviewing the factors to be considered by your instructor in arriving at grades for the course. Grades will be based on the promise shown for success in industrial arts teaching as indicated by:

2. Evidence of [illegible] as revealed by:
   a. Length of [illegible]
   b. Professional [illegible] reflected by responsibilities assumed from class [illegible] the school to discussion, reading records and [illegible]

3. Quality of written [illegible] and general physique:
   a. Adequacy [illegible]
   b. Satisfactory organization
   c. Skill in oral presentation
   d. Scope of [illegible]

4. Knowledge of subject matter:
   a. Quality of [illegible] for discussion
   b. Amount and [illegible] of reading
   c. Thoroughness of [illegible] as revealed in tests and examinations.

BIBLIOGRAPHY:

Education 420 [illegible]

I. Philosophy of Industrial Arts
   A. Industrial Arts in General Education
   B. Relationship [illegible] to General Education
   C. Nature of Modern Culture
   D. Culture - Medium of Cultural Change through Industrial Arts
   E. Meeting Individual Needs
   F. Industrial Arts for Blind Students. See [illegible]

II. Objectives of Industrial Arts
   A. Relationship of Industrial Arts to General Education
   B. Analysis of Objectives

III. Conclusions as to Industrial Arts Definition, Function, Scope, Content, Method, Physical Setting, and Historical Perspective

IV. Foundations of Industrial Arts
   A. The Human Individual
      1. Experience as a Natural Means of Growth
      2. Participation and Creativity - the Theory
   B. The Economic Pattern and Involves Everyone
      1. Nature and Magnitude of the Economy
      2. A Curriculum to Reflect Technology is Required
      3. Resulting Divisions of Subject Matter
   C. What Are the Cultural Results?
      1. In a Material Sense
      2. In a Social Sense

V. Functions to be Achieved
   A. Orientation
      1. Industrial
      2. Occupational
      3. Cultural Perception
   B. Technical
      1. Materials
      2. Tools and Machines
      3. Processes
      4. Products and Their Usage
      5. Organization and Management
      6. Research and Planning
   C. Recreation
      1. Exploration
      2. Personal Need
      3. Enrichment and Creativity
      4. Relaxation or Therapy

VI. Programs and Its [illegible]
A. Secondary Level
1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]
7. [illegible]
8. Service
B. Adult Type
1. [illegible]
2. [illegible]
3. [illegible]
4. Recreational
C. Professional Type
1. Technical, to Extend Teacher Competence
2. Professional, to Extend Teacher Competence
3. Service [illegible] for Special Functions in the School
4. In-Service
D. Programs for the Blind

VII. Understanding Industrial Arts
A. A Planned Educational Experience
B. The Student's Interest
C. The Laboratory [illegible]

VIII. Industrial Arts in the School Program
A. Relationship to [illegible] areas
B. Industrial Arts in Elementary School, Junior High School, Senior High School

IX. The Industrial Arts Laboratory
A. Comprehensive Laboratory
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X. Organizing the Instructional Program
A. Planning the Year's Work
B. Courses of Study
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XI. Selection of Subject Matter for Industrial Arts
A. Basis of Selection
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XII. Methods of Industrial Arts Teaching
A. Instructional Methods
B. The Demonstration
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III. Understanding [illegible]
   A. Emotional Problems
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IV. Laboratory Plans for Records, Equipment and Organization

V. Guidance
   A. Educational Values
   B. Social Values

VI. Typical Types
   A. Mental - See Psychology
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VII. Issues to be Faced

VIII. Special Topics to be Covered with a Visiting Consultant

1. Use of Resource Persons with Blind [illegible]
   a.
   b.
   c.

2. Attitudes of Blind Children
   a.
   b.
   c.

3. Travel Problems
   a.
   b.
   c.

4. Problems of the Partially Seeing
   a.
   b.
   c.

5. Integrating the Blind Child with Sighted Class
   a.
   b.
   c.

6. Dealing with the Mentally Retarded Blind Child
   a.
   b.
   c.

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Four-Step Method of Procedure

Orient the blind student to his new environment until he is familiar with the location and position of his work bench, tool rack, tools, tool room, machines and source of supply by showing him the relative position of the equipment and facilities using the door as a point of reference. Make certain that he has located by touch, each piece of equipment and can identify it.

The following "Four-Step Method of Procedure" is recommended in teaching the use of any tool or power equipment:

1. General Housekeeping and Care of Tools and Equipment
   a. Instruct the student in the method of storing tools and supplies used in the shop. If the student has any responsibility in regard to storage of tools or supplies, the instructor should fully explain and demonstrate these responsibilities. Identification of tools and supplies should be fixed by placing the hands of the student on them. He should demonstrate what he has learned by locating and removing each tool and article and properly replacing it without assistance.
   b. Teach the student to keep work bench, machine and floor free from shavings, cuttings, and litter and insist that he perform this task without the assistance of sighted students. The student can determine when the floor is clean through the feel of his feet on the floor and the sound and resistance of debris on the broom or brush.

2. Identification of Tool - Name and Type
   a. Make the student familiar with each hand tool by handing it to him, identifying it by name and type, pointing out its various parts and making certain that he recognizes them by touch. When showing a sharp-edge tool, have the student approach the edge from the back or handle.
   b. With the power turned off, acquaint the student with each piece of machinery, identifying it by name and type. As he examines each part carefully by touch, make certain he can properly identify it and is familiar with its relation to other parts of the machine as they are pointed out.

3. Use of Tool
   After a student is familiar with the name and type of a particular tool or machine, the instructor should fully explain its purpose, demonstrate its use and explain each step, making certain that the trainee observes by touch and understands the use of the tool.

4. Correct Method of Manipulation or Operation
   (Approach, Position, Grasp and Motion)
   The instructor should demonstrate by performing operations involving the various actions of approach, position, grasp and motion, making certain that the student observes by touch and understands every movement and action that has been taken.

Example of Instructing by Means of the Four-Step Method

1. The instructor should ask the blind student to take HIS arm. The student should grasp the instructor's arm between the shoulder and elbow securely enough to enable him to follow easily and remain about one-half step behind his guide. As the instructor and student proceed in this manner, every moment will convey a meaning to the student and they will be able to move quickly and safely with a minimumof effort. Do not permit the student to walk with hands extended but have him keep them down at his sides.

   The instructor should acquaint the student with his surroundings in the following manner:
   a. By giving a verbal description of the size, shapre, arrangement and content of the shop and its facilities.
   b. By conducting him through the shop, identifying the location of each facility and explaining the arrangement and location of everything as they proceed.
   c. By repeating the tour taking time to point out the details of everything formerly described, having the student locate and identify them by touch, sound or relative position.
   d. By having the student make the tour, demonstrating without assistance what he has learned while the instructor follows to give guidance and correction where necessary.

2. Acquaint the student with the location of a particular bench or machine to be used and its relative position to other facilities such as tool room, stock room and sink.
   By proceeding with the same method of instruction outlined in section "1" of this example making certain that the student understands and can accurately demonstrate without assistance what he has been taught.

3. Explain how to keep bench or machine in order:
   a. By instructing the student in the proper arrangement and method of storing tools and supplies. 2. By placing his hands on them and having him demonstrate what he has learned. 3. By locating and removing each tool and article and replacing it properly without assistance.
   b. By teaching him to keep work bench, machine and floor free from shavings, cuttings, and litter, and insisting that he perform this task without assistance from a sighted student. The trainee can determine when the floor is clean through the feel of his feet on the floor and the sound and resistance of debris on the broom or brush.

4. Acquaint the student with the different types of tools and define their purpose by explaining:
   a. That cutting tools are used solely to change the sizes and shapes of materials. This is accomplished by removing portions of the material, therefore, the cutting edge must be harder than the material being cut.
   b. That utility tools are convenient devices used by students to accomplish a desired result with greater ease, speed and accuracy.
   c. That special tools are devised for a particular purpose in facilitating or performing a certain operation or job, or for constructing a particular item.

5. Acquaint the student with the name and type of a particular tool or machine, its use and the proper method of manipulation or operation in the following manner:
   a. Make the student familiar with each hand tool by handing it to him, identifying it by name and type. Point out its various parts and make certain that he recognizes them by touch. (When handing a student a sharp-edge tool, he should approach the edge from the back or handle).
   b. Acquaint the student with each piece of machinery when the power is turned off, identifying it by name and type. As the student examines each part carefully by touch, make certain that he can properly identify it and is familiar with its relation to other parts of the machine as they are pointed out.
   c. After a student is familiar with the name and type of a particular tool or machine, the instructor should fully explain its purpose, demonstrate its use and explain each step, making certain that the trainee observes by touch and understands the use of the tool or machine.

Four-Step Pattern of Safety

Before assigning a student to work with power equipment, the instructor should thoroughly familiarize him with a well-defined pattern of safety.

1. Making Approach and Primary Contact to Power Machines
   a. Have the student step to a working position directly in front of the machine with both hands down at his sides. With the palms toward him bring both hands forward until the backs touch the table of the machine. This will enable the student to locate a working position and determine the height and scope of the work area without danger of bruising his hands or getting them into moving parts.
   b. As a precautionary measure, the instructor should examine all machines and make sure there are no moving parts or danger points exposed beneath the level of the work table.

2. Observing the State of Rest or Motion of the Machine
   a. With both hands on the table of the machine as described in Step 1 (a), the student will usually be able to detect when a machine is in motion by sound or vibration.
   b. The instructor should start and stop the machine, having the student listen for changes in sound and having him touch the work table to detect changes in vibration.
   c. When the machine is coasting and there is little or no vibration, and the noise from other machines or outside interference makes the identifying sound inaudible, the state of rest or motion can be determined by touching the end of a shaft or other moving part, or by running a piece of scrap wood against the blade or cutting edge.
   d. The instructor should guide the hand of the student from the primary point of CONTACT along a safe path to and from the moving part to be used as an identification point.
   e. Before examining any machine, always determine the state of rest or motion by adhering strictly to touching the end of a shaft, spindle or other moving part which is safe.

3. Following Paths from the Primary Points of CONTACT to and From Points of Control and Points of OBSERVATION of the Progress of the Work
   a. Safe paths to follow should be determined when the machine is not in motion.
   b. Switches, levers and all controls can be located by following from the point of primary CONTACT along the edge of the work table until a familiar spot or part is reached and then following it to the desired CONTROL.
   c. The instructor should guide the hand of the student from the point of primary CONTACT along a safe path to and from the desired point of CONTROL.
   d. Approximate heights such as shoulder and head are helpful in estimating locations, however, the student should not be permitted to reach promiscuously for controls or other objects about the work area.
   e. Points of OBSERVATION of the progress of the work being done by the machine are located by following the same procedure as that for locating controls.
   f. FOLLOWING THE PATHS OF SAFETY MUST DEFINITELY BECOME A HABIT.

4. Observing the Progress of the Work Being Done by the Machine by Sound, Feel and Touch
   a. The instructor should demonstrate the progress of the work being done by the machine by performing a work process which the student can observe by -
      1. SOUND such as that of a hack saw cutting a steel rod which constantly changes as the cut is being made. A complete operation should be performed in order that the trainee may observe the changes in sound as the cut progresses.
      2. FEEL such as the resistance exerted on the feed lever of a drill press which decreases as the point of the drill breaks through the material. A complete operation should be performed in order that the student may place his hand on the hand of the instructor and observe the change in resistance exerted by the feed lever.
      3. TOUCH such as observing the position of the feed wheel or the changing position of a previously identified part as it approaches a stop or completes its travel in a given direction. A complete operation should be performed in order that the instructor may place the hand of the student on the feed wheel or moving part to identify the progress of the work being done by the machine.

Most tools, both hand and power, have characteristics which are distinctive to the student who is familiar with their operation and use.

Safety Practices to be Observed in Shops with Power Equipment

1. The student should be impressed with the necessity for safe conduct by making a tour around the shop pointing out danger spots and how to avoid them by using the same method of instruction outlined in Step "1" of the "Example of Instructing by Means of the Four-Step Method of Procedure". Make certain that he can accurately demonstrate without assistance what he has been taught.

2. The student should wear short sleeves which fit the arm snugly about halfway between the elbow and shoulder; remove tie, rings and watches; and wear no gloves or loose clothing.

3. The student should keep all machines free of litter and all litter should be kept from the floor to prevent stumbling or slipping and falling into a machine. (The student can determine when the floor is clean through the feel of his feet on the floor and the sound and resistance of debris on the broom or brush).

4. The student is not to operate any machine unless fully instructed and assigned to by the instructor.

5. The student is to keep away from machines being operated by another student.

6. The student should never oil or adjust a machine in motion. (Before examining any machine, always determine the state of rest or motion by adhering strictly to contacting the end of a shaft, spindle, or other moving part as described in Step "2" of the "Four-Step Pattern of Safety".

7. The student must not crowd or stand in line with a piece of stock when feeding a machine. Give the machine time to function properly.

8. The student should work on the right hand side of the table when using the sand disc. Hold the work down tightly and keep the fingers away from the disc. (Ref: "Four-Step Pattern of Safety").

9. The student should operate wood lathes at speeds according to the size and balance of the piece being turned. Keep tool rests close to the work and grasp tools firmly. (Ref: "Four-Step Pattern of Safety".)

10. The student should report all accidents no matter how small; all personal injuries regardless of how slight; and all irregularities in the performance of a machine.

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General Methods of Instructing Students

The objectives of instruction are to develop within the student a necessary knowledge of, and some skill in, the use of certain tools and equipment; knowledge of proper safety procedures; work tolerance; ability to orient and adjust to a work situation; a spirit of group cooperation; and an appreciation of what is required to hold a job.

Although the methods of perception used by blind persons enable them to make identifications accurately and to become aware of and adjust to changing conditions quickly, custom has caused society to believe that sight is an essential factor for the operation of most power equipment as well as for the manipulation of hand tools. Experience has shown that persons without sight when properly selected and trained can operate most power equipment and perform most operations. The following discussion explains instructional methods and procedures which enable instructors to teach persons without sight to operate the same quipment and perform the same operations as readily and efficiently as persons with sight.

In general, the same methods used in teaching sighted students are used in teaching the blind, the difference being that when the blind person is told, shown and illustrated to, the object of demonstration must be contactible by touch or perceptible by sound in order that the student may accurately visualize sizes, shapes, locations, positions and procedures.

Objects which are so large that the entire area cannot be contacted by touch or cannot be comprehended by touching portions or segments must be described by comparison with another object of similar character or design with which the blind student is familiar.

Mental images which cannot be acquired by association of ideas or by touch must be portrayed by a word picture which is meaningful and within the comprehension of a particular individual.

Identification of materials is made by lifting to compare weight and size; smelling to determine odor; feeling to determine shape, grain, content, texture and temperature; and pressing with the finger or instrument to determine firmness or density. Positions and locations are ascertained by means of a central starting point from which the student can orient his movements. Achievement is attained by making use of the remaining senses such as feeling, hearing, and smelling instead of the use of sight.

The progress of the work being done, as well as the performance of power equipment, is determined by sound, vibration, touch and relative position of parts. Contact by touch is safely made by determining a point from which to start and carefully following a predetermined path of safety to the desired position.

In preparing instructors for teaching the blind student, he should be thoroughly acquainted with the instruction to be covered; methods to be employed; procedure to be followed; and results to be attained.

It is suggested that the instructor with no knowledge of, or former experience in teaching blind students, blindfold himself and receive instruction. The purpose of this procedure is to acquaint the instructor with the methods used in training blind persons by having him receive instructions under simulated conditions. This method has been found interesting and satisfactory by a number of instructors as it has enabled them to understand the point of view of the student.

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The Use of Basic Abilities by Blind Persons

The term, basic abilities by blind persons, is defined as "The determination and development of sensory and mental abilities, physical capacities, and personality traits important to the functioning of blind persons".

Sensory Abilities Listed and Defined

Olfactory ability:
The ability to recall and recognize odors.

Kinesthetic ability:
a. Perception. The ability to appreciate proportion, distance and weight through pressures and tensions in the muscles, tendons and joints.
b. Memory. The ability to retain awareness of distance, proportion and weight.

Equilibrium:
The ability to know and control the position of the body in relation to the surface of the earth.

Sound localization:
The ability to determine the direction and distance of the source of sound in relation to the position of the body.

Mental-Sensory Abilities Listed and Defined

Physical orientation:
a. Within surrounding areas. The ability to find and keep one's bearing within one's auditory horizon.
b. Within work space. The ability to discern the location of and the relationship between points of reference within the work space.

Coordination:
a. Bi-manual. The ability to move both hands so as to maintain any desired relationship between them.
b. Hand-foot. The ability to move the hands and feet, in any combination, so as to maintain any desired relationship between them.
c. General. The ability to move any or all parts of the body in any combination so as to maintain any desired relationship between them.

Manipulative ability:
a. Finger dexterity. The ability to manipulate a finger or fingers purposefully and effectively.
b. Manual dexterity. The ability to manipulate one or both hands purposefully and effectively.

Tactual perception:
The ability to distinguish temperature, texture and contour by touch.

Mental Abilities Listed and Defined

Constructive imagination:
The ability to synthesize the separate components of an object so as to obtain a correct conception of its construction or to obtain such a conception by relating some of the components of the object to its function.

Retention:
The ability to preserve knowledge and developed abilities so as to make recall or recognition possible and relearning easier than the learning of new material.

Learning ability:
The thoroughness and facility with which knowledge is acquired and abilities are developed.

Imaging ability:
The ability to represent in the mind a person, place or thing by past or present sensory experience and accompanying feeling.

Rating Scale for Sensory and Mental Abilities

In considering the development of a practical scale for rating the sensory and mental abilities important to the functioning of blind persons, the committee recognized the necessity of selecting a specific representative area. After some deliberation it was agreed that the vocational area was the one which afforded the most definite levels of functioning. It also felt that on the one hand performance in the vocational area is representative of an individual's general level of functioning and on the other hand the vocational level on which he can function determines to a large measure his level of functioning in the general areas of personal and social performance.

Rating Scale

Rating symbols:

"5" Sufficiently superior to constitute a special vocational asset.

"4" Adequate to meet the demands of employment under fully competitive conditions on jobs in which the ability rated is a primary requirement for success.

"3" Adequate to meet the demands of employment under full competitive conditions on jobs in which the ability rates is a secondary requirement for success or to meet the demands of employment in a special workshop for the blind on jobs in which the ability rated is a primary requirement for success.

"2" Sufficient to meet the demands for employment under special conditions where only minimum level performance is required in the ability rated.

"1" Sufficiently limited to constitute a disability.

Suggested Methods of Determining and Developing Sensory and Motor Abilities

The methods that follow are intended to be merely suggestive. Time has not permitted the outlining of such methods in detail.

Olfactory:

1. Identify collected samples of various substances with distinctive odors.
2. Identify stores, manufacturing plants, etc., by their distinctive odors.
3. Move toward the source of distinctive odors.

Note: Encourage the development of this ability in home economics, personal grooming, etc.

Kinesthetic ability, perception:

1. Simultaneous comparison of the weight of two articles.
2. The simultaneous comparison of articles of either similar or different shapes.
3. Simultaneous comparison of the length, breadth or depth of two articles.

Kinesthetic ability, memory:

1. Practice in learning the correct application and duration of pressure to be applied to the control of levers of machines such as drill presses, lathes, sewing machines, typewriters, mechanical juicers, hand looms, etc.
2. Grade sticks according to length without touching more than one at a time.
3. Estimating the lineal measure of selected articles.
4. Walk a given distance, stop, then attempt to walk a similar distance. (Check the second distance against the first).
5. Note a given height and attempt to indicate same height in a different location.
6. Playing the violin or trombone.

Equilibrium:

1. Note ability to walk without weaving or staggering.
2. Stoop forward or lean to either side within normal limits and regain upright position.
3. Walk the broad side of a 1" x 4" x 16" board on the floor.
4. "Barrel walking".

Sound localization:

1. Locate dropped coins.
2. Locate squeaks and rattles in moving machinery.
3. Walk to a voice or source of sound or follow a moving sound.

Physical orientation within the surrounding area:

1. Point to or correctly indicate the location of points of reference such as bus stops, buildings, intersections, etc.
2. Point to or correctly indicate doors, windows, and pieces of furniture while standing in a room previously explored.
3. Note the readiness with which the ability to get about in a new environment is acquired.

Physical Orientation within the work space:

1. Reaching directly while in a working position to tools, parts, bins or containers.

Coordination - bi-manual:
1. Operating hand-crank egg beater.
2. Operating a drill press fitted with a movable jig for holding work.
3. Operating a table type hand power carters wheel.

Coordination - hand-foot:
1. Operating a floor loom.
2. Operating a kick press.
3. Operating a treadle sewing machine.

Coordination - general:
1. Jump or skip rope.
2. Saw wood (hand saw).
3. Dancing.

Manipulative ability - finger dexterity:
1. Knitting
2. Assembly of small parts.
3. Tying shoes or string.

Manipulative ability - manual dexterity:
1. Washing and drying dishes.
2. Balling yarn.
3. Milking cows.

Tactual perception:
1. Grading abrasives.
2. Sorting cloth as to weave.
3. Testing the temperature of a baby bottle.
4. Determining proper time for taking plaster castings out of mold by checking their temperature with the hand.
5. Separate round from flat head screws or common from finishing nails.

Mental abilities - constructive imagination:
1. Assembly of objects using models such as water faucets, mortise locks, mop heads, etc.
2. Complete the assembly of partially assembled venetion blinds.
3. Complete a partially finished tinker toy or erector-set structure having a known function and purpose.
4. Thread a movie projector or sewing machine when there has been little or no previous experience.
5. Assemble a level-wind, star drag fishing reel.

Mental abilities - retention:
1. Compare current performance on a task with previous performance after an extended interval of no practice.

Mental abilities - learning:
1. Measure speed and accuracy of performance on an unfamiliar task before and after practice.

[illegible]

[illegible] ability:

1. Have the person examine carefully a piece of unfamiliar equipment, asking him to describe or use it and note his ability to do so.
2. Identify small objects or models of large objects with which familiarity can be presumed.
3. Locate rooms, hallways, etc., on the basis of the examination of a simple representation or diagram of the area involved.

([illegible] Centers for the Blind, Findings of the Spring Mill Conference February 19[illegible] American Foundation for the Blind, Inc.)

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Industrial Arts for Blind Pupils in the Elementary School Program

The curriculum consists of all the experiences children have both in and outside the school that are utilized by the school to further the aims of education. As the aims and resources of education change in keeping pace with new needs in a changing world, the curriculum too must be adaptable to new conditions. The increasing amount of mechanism, new materials and processes encountered in almost every phase of our daily living make it essential that industrial arts experiences be regarded as basic and fundamental for all pupils at all school levels.

Industrial Arts - What it is

Industrial arts is an integral phase of the total program of education in the elementary school because it is designed to further all of the programs, objectives and to enrich the experiences pupils need in attaining these objectives through knowledges to be acquired, skills to be mastered, and attitudes and appreciations to be developed. It is more than making things.

Industrial arts experiences for blind pupils, especially as it pertains to the exploration and guidance values, has long been a matter of real concern for educators interested in preparing these pupils realistically. Since one of the most consistent aims in the education of blind pupils has been that these children, within the limits of their abilities and problems common to all children, should pursue the same curriculum as sighted children, then it is necessary that industrial arts experiences should be provided for all blind pupils, both boys and girls.

Industrial Arts - What It Does

Industrial arts, the study of materials and how they are processed to meet our particular needs, makes an important contribution to the elementary school curriculum because:

It enhances the existing curriculum through providing tangible first-hand experiences for all boys and girls concerning industrial occupations, materials, processes and tools related to the grade units of study.

It makes functional use of knowledge and skills acquired in the social studies, language arts, science, music, mathematics, art and physical activities.

It develops adequate meanings by reducing levels of abstraction. "Learning by doing".

It provides socializing experiences through cooperative action.

It offers opportunities for the early development of constructive leisure-time activities and hobbies requiring mental and physical activity.

It develops sound practices, attitudes and appreciations of safety with application to school, home and community.

It develops an early appreciation of the influence that industry has on our social and economic life; and the ability to select, care for and use industrial products intelligently.

It develops the ability to plan and work, alone and cooperatively, toward the orderly, efficient and complete performance of assigned and selected tasks.

It develops a measure of skill in the use of tools and materials; and understanding of basic types of construction, repair, and maintenance.

It provides opportunities to enrich the present elementary school curriculum through pupil participation in a variety of motivating and meaningful processes involving investigating, experimenting, planning and creating.

The Industrial Arts Consultant

The industrial arts teacher in the elementary school has a new and broader function. Today the industrial arts consultant is available to all children and all teachers when they need his special services, either in the classroom or shop. His responsibility has broadened from the development of special techniques for some children to a concern for the intellectual, emotional, moral, physical, and social development of all children in the school.

The classroom teacher is the core of the educational program with chief responsibility for the total curricula of the child. The consultant's function is to aid him (her) in the manner he (she) feels will best serve the particular child. The classroom teacher determines the use of the consultant.

The use of the industrial arts consultant is recognized as an integral part of the classroom program; and as a desired resource in the regular teacher's work with her pupils. This special teacher is a resource person who implements study through industrial arts by providing materials, acting as a consultant, and by demonstrating teaching techniques. The use of the consultant permits greater flexibility in the use of time and provides for greater adaptability in the elementary school program.

Elementary Skills Learned Through Industrial Arts

Industrial arts makes a distinct contribution to the elementary school program through its own subject content, methods and techniques. Increased emphasis in this area is gaining in importance and popularity among elementary grade teachers throughout the United States as a means of making the curriculum richer and more meaningful. Manipulative activities inherent in the content of industrial arts have long been recognized by educators as some of the most effective experiences in the learning process that a child may have. Since the time of Pestalozzi and Comenius it has been recognized that children learn more effectively by going from things to words, and by educating first the senses, then the intellect.

Industrial arts activities contribute to integrated learnings through the many opportunities for practical application of instruction in other elementary school areas, for example:

Language Arts

Read stories which suggest activities from books, charts, bulletin boards.

Read directions for project construction.

Spelling, pronunciation and meaning of technical words introduced.

Correct usage of terms.

Write about activities.

Write directions or steps for simple procedure.

Give individual or committee reports of activities.

Social Studies

Sources of raw materials.

Acquaintance with ways of changing raw materials into useful products.

History of development of tools and machines.

Knowledge of industrial products used in home living.

Mathematics

Problems in the cost of materials and tools.

Use of rule and other measuring devices.

Counting materials and supplies.

Comparison of sizes and weights of various items used.

Science

Processes involved in changing wood, metal, and clay into articles.

Preservation of materials by use of finishes.

Application of scientific principles through use of tools.

Composition and properties of materials.

Use of magnets, compasses, motors.

Expressing creative ideas through materials.

Essentials of good design in craft work.

Sketching and drawing projects.

Interpreting working drawings.

Develop feeling for shape, texture, proportion.

Health

Practical application of safe, orderly work habits.

Personal safety precautions to be converted into habits by pupils.

Importance of good lighting and ventilation in shop.

Required use of safety devices such as goggles and guards.

Development of physical self through manual activities.

Music

Constructing rythm musical instruments.

Appreciation of tonal quality of instruments constructed.

Knowledge of transmission of music by radio, television, and phonograph.

Creating clay busts of music leaders.

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Evaluation

The blind person often finds that he must compete with the sighted in both school and our industrial society. The blind student in industrial arts must meet the objectives and training standards equivalent to those of the fully sighted students. This helps to condition these students, both mentally and physically, to meeting the requirements of our industrial and technological society.

Evaluation is difficult for several reasons. The evaluation program is dependent on the objective, content, and method of presenting industrial arts in general education. The development of suitable evaluation techniques is much the same as developing an instructional program. First you must state your objectives which represent the outcome which is desired and evaluate to the extent to which they are being achieved. The objectives should be analyzed in terms of behavior changes which are observable, this is the second step.

Thirdly, we should isolate situations where behavior changes may be noted. In order to record behavior changes it is necessary to determine whether they have occurred. Each desired behavior change should be reviewed by the teacher and determine the best method of obtaining the behavior change.

When the teacher has determined the behavior changes that he wishes to evaluate, he must determine a method of recording the results. This can take the form of a test, or it may be an actual record of what the student does.

If the information collected and compiled is not used in the proper way the system of marking will have no value. The teacher must establish an effective marking system. Some of the characteristics of an effective marking system are as follows:

1. It should take a minimum of teacher time.
2. It should be based upon a wide scope of student responses and activities.
3. Marking should be frequent.
4. Uniform standards should be applied.
5. Students should understand the system.
6. Students should have access to their marks.
7. Students should participate in evaluation.
8. Marking should be based on objective approach.
9. Records must be permanent.

Society must provide education for all students who can benefit whether they are sighted or visually handicapped. As the society in which man lives is constantly changing and becomes increasingly complex, the curriculum and evaluation must be flexible enough to keep pace. If this does not happen, education is not fulfilling the obligation of society.

There is a great deal of progress to be made in the area of evaluation. The teacher should learn to evaluate the instruments that are available and determine what merit, if any, they have for the blind or partially sighted. The individual should also develop an experimental attitude toward evaluation. After he has constructed his own evaluation instrument he should use it with confidence and recognize any problems that may arise in using it. It may be necessary for the teacher to change or reconstruct the evaluation many times before it will meet the individual needs.

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LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Meeting the student and orientating him to the room, tools, benches	1. Introduction 2. Familiarizing the student by letting him feel objects, pace the distance of the room, etc.	Set up method for ohms law.	No fear of electricity.
Questioning student on his likes and background	Question and answer	Interested in raised line drawings.	
		Instruction in soldering.	
Large motor	Demonstration	Trouble with soldering iron.	
Small motor	"		
Permanent magnet	"		
Electric magnet	"		
Tool board	"		

Special Aids or Devices Used

Student Reactions (cont'd.)

6. Wants information on water detecting device for checking [illegible]

Student Reactions

1. Very sensitive these tools for blind, wants to use same as normal students.
2. Shows some signs of not knowing what he wants to
3. Wants to learn how to
4. Has some knowledge of
[illegible] who really
[illegible]

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Complete orientation of the tool board		On raised line kit the plastic or cellophane does not remain still.	Finds the plastic square holder [illegible] acceptable.
. How to use the raised letter drawing board to identify letters and symbols	Demonstration and actual practice	Suggest better method of holding plastic in position.	
. How to develop a useable method of reading Ohms Law	Demonstration and actual practice	Make letters on raised drawings on 1" square.	
. Using the auditory analyzer to read ohms.			
. Reading the wire gauge and determining the various types of wire	Demonstration and examination		
. Operation of the electric panel board			

Special Aids or Devices Used

Raised line drawing board

Auditory test analyzer

Student [illegible]

Student will [illegible] difficulty with [illegible] method on audito[illegible]

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Laying out waterwheels for a motor 1. Wood block 2. Field core Mock new motor	Laying out sample block having student go save on his block. Field core layout	Combination navage too heavy. Could [illegible] guide block on edge of block	Some [illegible] detected [illegible] [illegible] Lays out [illegible] Laid out [illegible] motor

Special Aids or Devices Used

Parts rack with partitions to separate parts

Standard tool rack positions

Guide block and hand clamp on back saw operation

Student Reactions

Shows determination

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Continuation of lesson on motor layout	Having student use his previous layout experience to lay out ends for armature.	Carrying over from laying out wood and iron was fair. Better method could be used to lay off the metal and also use the shears. Suggest putting one side of shear in the vise so student can exert more leverage or trying another method of cutting metal.	The final pieces did not match too well.

Special Aids or Devices Used

None

Student Reaction

Appears very nervous [illegible].

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Drilling holes in armature and field pieces. Sharpening shaft of armature Bending field pieces Cutting ends for armature	Demonstrations: How to use the drill press. How to clamp material for drilling. How to drill holes. How to bend band iron using two vises. Student Activity: Drilling holes Sharpening shaft Bending fired pieces	Laying off sheet metal for ends could be speeded up by use of a template	Sides of armature were quite accurate.
Special Aids or Devices Used None			Student Reactions Seemed quite confident in his ability to use the drill press. Made good progress today.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Mounting the parts of the motor Started soldering	Model - Problem Solving 1. Having student plan how to do the job. 2. Doing the job.	Should have a multi-pocket apron, similar to carpenters apron to keep small tools that are to be used continuously on each job. Difficulty in finding center of hole to put screw in. Suggest centering device. Vertical leveling device would be good aid in driving wood screws.	Has a very good idea of what he is doing. Off on the use of the hammer today.

Special Aids or Devices Used

A drill bit proved to be a good aid in finding center under a hole. A handle could be made for the bit or possibly a tap handle.

Student Reactions

Very pleased with progress he is making.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Soldering 1. Butt joint 2. Lap joint 3. Adhere to metal	Using numerous aids. Related information on: a. Soldering b. Characteristic of different metals	Solder bends when heated and student has difficulty finding the position again.	Results were good. Conclusion: Soldering would only come with lots of practice.

Special Aids or Devices Used

Insulated soldering gun.

Soldering aids with parallel grooves. Soldering iron with 7 point [illegible] tool.

Student Evaluation

Very active.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Winding armature	Demonstration. Student winds armature	Very hard for student to determine when turns are close together.	
Winding field	Demonstration. Student winds field	Tension should be kept on wire when winding.	Finished both jobs.

Special Aids or Devices Used

None

Student Reactions

Realised his difficulty.

Improved toward the last.

Anxious to get motor working.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. To complete the winding of the field. 2. Solder the armature to the brushes a. Mount the brushes. 3. Final mounting of armature and the field 4. Hooking up the armature and the field	Problem solving from previous lessons on winding Related information 1. Use of spaghetti tubing 2. Checking for shorts using audio analyzer 3. Conductivity of metals 4. Cleaning wire	Bearings on motor caused quite a bit of friction.	Motor worked on first try.

Special Aids or Devices Used

Audio Analyzer

Soldering aid

Student Reactions

Glad to know project is working fine.

Always asks if bench is clean.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEM IDENTIFICATION & SUGGESTED CHANGES	RESULTS
Checking motor out Reviewing previous information student had on how the motor operates. How the [illegible] motor is assembled	Running the motor. Comparing with the model. [illegible]	serving over pressure on the brushes. causing the rotation out of the armature bearing. trial and error. [illegible]	Most [illegible] with each repair and adjustment. Does not need to [illegible]

Special Aids or Devices Used

None

E2-1

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Introduction to electrical area 1. Sending and receiving radio waves 2. Schematic diagrams 3. Actual radio model he will build	Introduced student to: 1. The radio model 2. Method of hook-up with earphones and amplifier 3. Introduced student to the citizens hand receiver and also how it operates	1. We find that keeping braille diagrams mounted on heavy cardboard is almost a necessity. 2. Student has quite a fund of knowledge, however we are going to conduct lessons with him.	Student was extremely interested in suggested set after hearing it connected thru amplifier.

Special Aids or Devices Used	Student Reactions
Braille diagram of: 1. Radio waves leaving the transmitting station. 2. Schematic drawing of crystal set.	Extremely interested in project (crystal radio) Note: Student has a novice radio operator's license.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Winding coil-making pig tails at markings on dowel.	Had 1" dowel with marks at places where pig tails are to be made and hole in each end for starting and ending coil.	Set up spool of wire so there is enough tension to keep it tight. We accomplished this by putting the coil in the bench draw.	Very good. He wound his coil as tight and close as most sighted students.

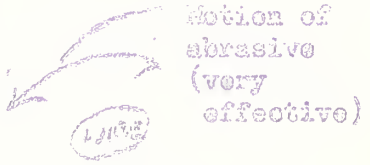
Special Aids or Devices Used

None

Student Reactions

Very much interested in making the crystal set.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. Fabrication of front panel for radio. 2. Sanded base 3. Mounted fahnstock clips 4. Cut wire for leads 5. Prepared coil for soldering and mounting	1. Showed student use of combination square and how it can be used as a measuring gauge. 2. Proper use of tin snips. 3. Had student measure an irregular surface with a piece of wire.	1. Had trouble cutting a straight line on a piece of sheet metal with tin snips. 2. Inscribed line on upper left hand side of piece of metal as a guide. Used metal shears as the cutting - worked good. 3. Had a little difficulty removing enamel from copper wire but using this method, student was very effective.  Motion of abrasive (very effective)	The parts were fabricated without any serious complications.

Special Aids or Devices Used

Braille combination square
" rule
" scriber

Student Reactions

Enjoys doing this work very much.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Mounting coil and front panel to base. Locating, drilling and punching holes for front panel.	Introduction to simple layout. Drill press operation Use of hand punch Student participation in locating and mounting parts. Using model to solve problem.	Place punch in vise for ease of operation.	Very good at layout and measuring. Able to go ahead on his own.

Special Aids or Devices Used

Click-o-matic rule

Student Reactions

Very interested in work and wants everything to be perfect.

Has broad knowledge of electronics.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Soldering and preparation of wire for soldering. Tested completed project with both earphones and amplifier	Some practice wires for soldering were first prepared so student was familiarized with the soldering operation. Hooked amplifier up to crystal radio project and tuned in the various stations to check on the reception of the project.	Use wire strippers that can be pre-set instead of type that we are now using. Difficult soldering two wires together (especially when you have to hold gun and solder) at the same time. When using alligator clip holder, good results are attained. Soldering iron without protection works better - could be devised with partial protection if desired Used terminal clips with fahnestock clips to facilitate ease of soldering. To keep from burning the diode, wet paper toweling was wrapped around it during the soldering operation.	Excellent results with unprotected soldering iron in comparison with protected soldering iron. The terminal clips helped considerably.

Special Aids or Devices Used

Soldering gun prepared so all exposed hot places were wrapped with asbestos with exception of point.

Used adjustable screwdriver.

Special alligator clip jig for holding wires.

Raised braille diagram of radio schematic to follow.

Student Reactions

Very pleased with his results thus far.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Mount parts on base. Prepare wires. Prepared front panel and mounted toggle switch. Soldered wires to transistor clips.	Student measures, locates and mounts parts. Student participation. Student used drill press to drill holes in front panel.	Has problem holding hand drill. Need heatsinker or clips in place of soldering to avoid applying heat to transistor.	Student did an excellent job of soldering today, and a good job of locating screw holes.
Special Aids or Devices Used Click-n-matic rule Quick wedge screw driver			Student Reactions Student seems very interested in project.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Connected transistor to phones, input, resistor and condensor. Made battery clips to hold two flashlight batteries and mounted them on base.	Had student check diagram and tell us how he should run the wires.	Holding hand drill straight.	Very good. The student studied the diagram and was able to follow it.

Special Aids or Devices Used

Quick wedge screwdriver

Student Reactions

Still very much interested in completing his amplifier.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Start work on transistor amplifier to go with crystal set that student made. Studied schematic drawing before proceeding with project. Student cut and drilled panel and fastened clips on base.	Reviewed symbols on schematic drawing and pointed out new ones not used for crystal set.	Soft wood should be used for base.	Finished base and panel and mounted two clips.

Special Aids or Devices Used

Rained line schematic drawing.

Click-o-matic rule

Student Reactions

Very good.

Interested in new project.

EXPERIMENTAL INSTRUCTIONAL VALIDATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Connecting parts together. Completed the wiring and tested.	Made student tell us where he thought connections should be made after he checked the diagram.	None	Amplifier worked very well and was powerful enough to use a speaker on.

Special Aids or Devices Used

None

Student Reactions

Delighted over his success.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Code oscillator 1. Construction of base 2. Read schematic drawing on project to be constructed Reviewed typed assignment on transistors (introduction)	1. Had the student familiarize himself with the project by "reading" the braille drawing. 2. Student cut out base. 3. Student mounted fahnestock clips and battery clips and also mounts for transistor.	1. Wood selected for base should be soft so it can be easily worked and drilled. 2. Wire should be cut as needed rather than cut at predetermined lengths - saves material.	Student is progressing excellently and has experienced no problems of a technical nature. Has excellent ability in reading prepared schematic drawings of project.
	Special Aids or Devices Used Band saw with special jig.		Student Reactions Very interested in project he is now working on.

EXPERIENTIAL INSTRUCTIONAL UNIT

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Reading raised line schematic diagram. Soldering, connecting, mounting front panel. Use of the audiometer.	Student determines what has to be done from drawing and does the necessary work. Student has layout for holes and drills same. Student checks resistors with audio circuit analyzer		Student able to follow drawing very well. Very interested in circuit analyzer and its operation.

Special Aids or Devices Used

Wire strippers

Soldering gun

Student Reactions

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Shop Orientation Introduction to project Test Knowledge	Trip around shop introducing student to location of tools and equipment. Teaching aid employed to show various steps of project.	Had to get sample to explain knurling that is to be used A little difficulty in explaining gates on foundry casting. Had a little difficulty on caliper rule - inside and outside readings are confusing. Instruction employed very effective method of showing the drilling of metal - student's arm and instructor's finger used to demonstrate necessity of using center punch to prevent drill from walking on surface of metal.	Student [illegible] location and understand what is to be done. Appears to have a fundamental knowledge from his being here last year.

Special Aids or Devices Used

Teaching aid - shows various steps and processes in production of meat tenderizer

Student Reaction:

Very interested and [illegible] if he could start [illegible]

Activity	Method of Instruction	Problems Encountered & Suggested Changes	Results
(Continued from page III-1)	performance Speaking tool and its use	2) Inability to use appropriate terminology 3) Lack can be/is was used to advantage for set-off because student would not have a natural learning work 3) Difficult to measure internal radius with bradley rules when divisions fall transfer correction 4) Tool holder is adjusting tool bar to start facing procedure from center of work 5) Single counseling from facing procedure one to hit being diagonal of center [illegible]	2. Satisfactory 3. Appropriate 4. Parts work on [illegible] the tool [illegible] and [illegible] complete operation student was [illegible] [illegible] difficulty [illegible] tion [illegible] 5. Student was able to tell [illegible] cutting tool by [illegible] 6. Centers [illegible] [illegible] method
2) Inspect [illegible] [illegible] of chuck [illegible]			
3) Set-up [illegible] work in vise			
3) Use of [illegible] work			
4) [illegible] orientation to metal lathe			
5) Facing round stock [illegible] jaw chuck			
5) [illegible] [illegible] between centers			
5) Use of Combination Set [illegible]			

Special Aids or Devices Used

Hand reading sheet of most [illegible] [illegible] [illegible]

[illegible]

Student has [illegible] in operating the [illegible] recalled parts were enthusiastic

Was able to [illegible] the smaller projects [illegible] without being told

[illegible]

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	REMARKS
1. Straight turning on the engine lathe with round nose tool. 2. Work is to be cut down to the correct diameter as in plan 3. Work reversed and center drilled on other end (for knurling operation)	Metal lathe with three jaw chuck and dead center - work set up in this manner.	1. Measurement of depth of cut that is being taken. 2. Down to the [illegible] depth is reached for the length required. 3. [illegible] a step should be placed on the ways of the lathe. 4. Student counts number of revolutions on handwheel 5. Braille outside calipers seem to be difficult and awkward to set. 6. Sound from other machines interferes with operation (joiner and table saw)	Student [illegible] recall on information from previous one.

Special Aids or Devices Used

Teaching Aid - showing complete process of making most tendering.

Student [illegible]

Showed to [illegible] knowledge very quite [illegible] [illegible]

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Knurling handle and finishing handle Related lesson: Metal and its characteristics	Instructor had student make set up using 3 jaw chuck and dead center.	Set-up of knurling tool at right angle. When knurling you should either have a shoulder or run-off. When filing it must be the correct type of file. Use combination square whenever possible.	Upon completion, [illegible] said he was able to repeat the production of handle with the exception of facing.
Special Aids or Devices Used None			Student [illegible] Very pleased with accomplishment of this part of project.

M1-5 EXPERIMENTAL INSTRUCTIONAL MODULE

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Introduction to shaper Measured sample Make rough cut on block of aluminum	Demonstration with use of hands and fingers before going to machine. Examined the machine safety path. Must shield face. Listen for cut to adjust cut-depth. Click of automatic feed to left will move vise away from ram. Ditto to right will move vise toward ram.	Square work from vise . Use paper to find level of work. Use of finger nail important in getting close to measurements. Use of safety gorgles and shields Larger machine would be better. Solid base smoother run.	Very good. No problems This operation could be done very easily.

Special Aids or Devices Used

None

Student Reactions

Can tell when cut is not straight or level.

DAILY EXPERIMENTAL ACTIVITIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Squaring up work on the shaper	Combination tool bit is more satisfactory than changing tool bits.	Has learned how to increase feed manually so as to speed up operation. Check for finish cut by using a piece of paper instead of finger nail between work and cutting tool. A little difficult to square up work in shaper. Ratchet sound is a good indicator of speed.	All four sides squared today. One end also squared.
	Special Aids or Devices Used Braille combination square Piece of paper		Student Reactions Student very pleased with results.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Shaper work- Cutting ends, forming grooves, form chamfers on ends.	Lesson taped. Demonstration.	Shaper stroke hard set - Eq. from 4" to 2". Larger machine would have these settings on outside of machine. Problem of squaring work should be explained. To change tool bits in holder - leave tool holder in machine.	Small shaper not the best machine to teach this type of work.

Special Aids or Devices Used

Tape - "Metals in Everyday Living"
"Good Design"
"Designing a Project"
Teacher prepared tape and student listened to it.

Student Reactions

Satisfactory.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Related lesson on metals, their properties and special characteristics Lesson on layout of six equal parts spaced on head of meat tenderizer Set up work in shaper for shaping head.	Questions asked on related lesson. This information was given to student on tape yesterday.	Used combination square as a marking gauge. (We found this to be the best method). Has a difficult time lining up point of tool bit with lines on work surface. Will use hack saw to deepen lines before continuing with aid of combination square. In locating second mark drag tool across work so it will fall into place. Previously premarked.	Excellent

Special Aids or Devices Used

Braille combination square

Student Reactions

Very pleased with results.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Completion of cutting grooves in head of tenderizer Draw filing a. Types and kinds of files Locating center for drilling Re-orientation to drill press (student recalled from last year)	1. Little instruction was given because at this stage student was familiar enough with machine and knew what had to be done. Instructor only had to observe to see that student was using all safety precautions. 2. Student was asked to solve: I. How to find center in block a. Two methods were suggested Drawing diagonals Measuring b. Student claimed both methods were accurate and preferred to measure.	1. Alignment of cutting tool was made by moving the cross feed until student felt the tool bit drop into the hack saw cuts. 2. Student starting to become over-confident in operation of machine and by-passing the safe path of motion a. Reminded student of consequences. 3. Student used good judgement in removing metal shavings in vise jaws before re-positioning work for cross cut. 4. Tri-square was used against side of project and top of vise to check squareness of work in relation to cutting tool. 5. Student dropped combination square on floor and exercised caution in recovery by placing arm over forehead as he bent down. 6. During drilling operation student had difficult time in locating center punch mark with larger drill. a. Smaller drill was used to increase size of hole (Found mark immediately) 7. During draw filing operation student pulled file over end of work and rounded edges. a. Two pieces of wood, longer than metal project, were clamped in vise evenly and allowed file to be drawn across work squarely.	Note: Through observation and setting up definite safe operating procedures, it was noted that while student was bright and very conscientious, he became confused occassionally and started to check his work before machine actually stopped. Upon questioning student about psychological aspects of this machine it was learned that he was not concentrating. Again this could be due to the presence of instructors and knowing he will be corrected should an error be made. It is recommended that a larger and more accurate shaper be used for the blind. Too much end play in gears and relative smallness of machine and working area constitutes a hazard. This machine should not be operated by a student who does not possess mechanical ability.

Special Aids or Devices Used

Depth gauge on drill press was used for stop during drilling operations

Brailled combination square

Click-o-matic rule

Student Reactions

Student claimed work was [illegible] but should have been better.

M2-1

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Introduction to fundamentals, laboratory and equipment	Informal. Practice on squaring shear, tin snips, bar folder, box and pan brake.	Student had trouble using tin snips and calipers. Very poor mobility. (May be caused by new environment).	Very good at measuring.

Special Aids or Devices Used

None

Student Reactions

Normal under prevailing conditions.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
tools used in making a layout	objects. [illegible] writing lines or chalk board. [illegible] and aviation snips.	bination square. and [illegible] for drawing out [illegible] scribed line tool, hold snips. Student mis-places tools.	[illegible]

Special Aids or Devices Used

Raised line drawing model of project.

Student Response

Slow movements

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Locating holes for punching and punching holes	Problem solving a. Gave student problem of locating and let him go ahead on his own. 1. Laying out holes 2. Transferring measurements from drawing to sheet metal 3. Punching holes	Keeps forgetting which end of the combination square to use. (This material has been covered 4 times and he still has difficulty using it.)	Very good at comparing drawing with actual object. Student does not like to think for himself.
	Special Aids or Devices Used Braille combination square		Student Reactions Thinks that [illegible] a little hard

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. Measuring and cutting band iron	Supervisory - Demonstrated the hack saw and some of its uses.	Filing in wrong direction - showed student proper technique.	Square cut.
2. Locating and center punching holes in legs	Demonstration	Filed notches on sides of the band iron opposite the holes, the center punched.	Located holes easily.
3. Drilling holes	Instructions on drill press operation		Uses drill press efficiently.
4. Location of bends in legs	Bending band iron by use of machinist vice	Degree of band not clear to student	

Special Aids or Devices Used

Braille ruler

Braille combination square
Used template to locate holes

Student Reactions

He was pleased with result.

Student solved the problem of locating holes.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Locate and drill holes on legs of the letter holder Introduction to drill press Introduction to use of hack saw	Student participation Mark holes on legs by using a center punch Demonstration of filling of holes and filing rough edges	Hard for student to locate cross of punched lines with center punch. Make an indention with the scriber to get started. The point on the center punch is not pointed enough. Hard for student to locate line for starting back saw cut. Filed small notch to keep the blade from wandering off course.	Student seems to visualize more completely what finished object is going to look like and how to fabricate.
Special Aids or Devices Used Braille combination square Angle duplicator			Student Reactions Was amazed when he did a good job using the hack saw.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Bending in a vise.			
Types of angles and using the duplicator	Student participation. Demonstration of 1. Angle duplicator 2. Bending in vise 3. Riveting Student tries on practice pieces, then does own work on project.	Problem using angle duplicator 1. Is sort of awkward for a sighted person also.	
Laying out and bending legs Introduction to soldering.	Read to student from text - p. 133, unit 31	Problem of getting legs bent even. 1. Bend together 2. Jig could be used in making more than one item.	Very good results at riveting.

Special Aids or Devices Used

Angle duplicator

Rivet set

Student Reactions

Student was happy with results of riveting.

Student very interested in soldering.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. Cleaning metals	1. Cleaning brass with fine sandpaper. Polishing with steel wool.	1. The ends of the strips were harder to clean. Student saw he did not rub the ends as much as the centerpart.	1. Brass was attractive and smooth.
2. Protecting brass from paint	2. Masking the brass-petroleum jelly or oil	2. Place small block against brass to guide the tape along edge of the brass.	2. Brass covered or protected against paint.
3. Painting	3. Demonstration	3. Covering surface, spreading paint. Pour paint in shallow pan. Thin if necessary. Apply paint with small cloth. Clean hands with an all-purpose hand cleaner.	3. Needed to be touched up.
4. Review of related materials		Preparation of hands for painting-coat hands with some all-purpose hand cleaner to protect underneath nails and cuticles from the paint. Pour small amount of paint into pan. Measure amount of paint with finger on bottom of pan.	
5. Practice use of raised line drawing kit.			

Special Aids or Devices Used

1 - 0 of thin block to guide the edge of tape along the edge of brass.

Student Reactions

1. He was pleased with the touch of smooth brass.

2. He could not tell about results of the paint job as he was not able to touch the finished painted surfaces.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Soldering and sanding	1. Clean material to be soldered. 2. Apply flux and tin metal. 3. Solder brass trim to top and front of letter holder.	1. Heating tip on soldering iron too long. 2. Use iron with short heat tip and more insulation. Could not use torch unless guide was used.	Satisfactory.

Special Aids or Devices Used

Soldering iron wrapped with asbestos rope

Special guide on soldering iron

Bernz-matic torch

Student Reactions

Surprised at what he was capable of doing. Would like to try again.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
The spot welder and the use of the spot welder	Introduction. How and why the spot welder works. Demonstration 1. Preparing material (cleaning) 2. Adjusting time 3. Spot welding	Problem of adjusting time. 1. Pre adjust 2. Test pieces and instructor check Problem of holding stock 1. Use hand clamp 2. Use of foot lever throws him off balance. Place one hand on top body of machine.	Had very good results.

Special Aids or Devices Used

None

Student Reaction

Showed interest in what could be done on the spot welder.

Seems very easy, except for the heat

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Making a drawing of the project on the braille drawing board. Familiarizing student with machine a. Approach b. Operation c Parts	Demonstrating use of the braille drawing board. 1. Examining models 2. Practice drawing horizontal parallel lines. 3. Practice drawing vertical parallel lines. 4. Drawing project. Having student go through dry run.	Student should be given extensive practice in drawing vertical and horizontal lines to gain relationship of lines before starting work on plan of project. Have student use his finger along side of the rule to see that the hand holding the rule has the fingers out of way before drawing.	The flat rule from try square was easy to use. This rule works best.

Special Aids or Devices Used

Braille drawing board

Student Reactions

Very pleased with his work.

Knowledge of woodwork helps him in visualizing

EXPERIMENTAL INSTRUCTIONAL INVALIDATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. Related information a. How metal is used in industry b. How metal is mined. c. How metal is made. 2. Installing work in chuck a. Adjusting tools b. Feeding work	Questioning student on his knowledge of iron, steel, etc. Lecture on mining manufacturing. Demonstration. Installing work in machine, adjusting tools. Student performs the same after demonstrating.	Determining end of the cut. a. Depth of cut	Student follows instructions quite well. Completed his first cuts. Got the idea of the feel and sound of the machine.

Special Aids or Devices Used

Used masking tape as a stop.

Student Reactions

Very observing and anxious to learn.

Applies his knowledge of the wood lathe in running the machine lathe.

DEVELOPMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Student adjusting blade for proper cut. Adjusts chuck	Presentation of related material. Demonstrating proper position and set-up of lathe. Demonstrating use of white lead and machine oil for lubricating. Demonstrating automatic feed.	Difficult to determine depth of drilling Adjusting tool holder at proper angle. Unable to read speed of feed.	For a boy with no previous experience he gets very satisfactory results.

Special Aids or Devices Used

Tape which is fastened to lathe bed as a stop needs to be of more than one layer.

Student Reactions

Student considers metal lathe no more difficult to use than wood lathe

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. Cutting shoulder on center punch 2. Knurling of project 3. Facing	Demonstration of how to change belt on pulley for various speeds. Demonstrating knurling.	Difficult to feel work because stock heated. Rearranged stopper on lathe bed so length of shoulder could be cut. Suggest a wet cloth be used whenever possible to cool work faster so student can quickly feel work. Use of clamp is more satisfactory as use for stop than is taper.	More work done today than previous day, also lesson information speed up.

Special Aids or Devices Used

Stopper on lathe bed.
A thick piece of tape.
Second time we used a spring clip.

Student Reactions

Very pleased with what he learned and accomplished.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Cutting center punch down to proper length 1. Cutting taper 2. Facing stock	Demonstrating how to adjust lathe for cutting taper using compound rest. 1. Facing end of stock Student taking over after the demonstration.	Setting of machine for proper cutting angle. Hot metal falling on student hand.	Student was able to adjust controls quite accurately by the feeling which he received through the controls.

Special Aids or Devices Used

None

Student Reactions

Student is very observing.
He has very little difficulty with various operations.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Smoothing work with file. Polishing with emery cloth. Cleaning off machine with brush and cloth	Demonstrating 1. File 2. Emery cloth Have student do the same.	Difficulty staying away from the chuck while filing and polishing.	Tool was polished with ease by student. Student was able to work very close to knurling without running into difficulty.

Special Aids or Devices Used

None

Student Reactions

Reactions are natural and quick as familiarity with the switch and controls go.

DAILY INSTRUCTIONAL ANALYSIS

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Orientating student to shaper 1. Mounting of stock in vise 2. Adjusting machine 3. Cutting material	Demonstrating how to mount stock. a. Making adjustments to shaper b. Student activity c. Facing of first side d. Surfacing of second side e. Surfacing of third side	None	Three sides were surfaced.

Special Aids or Devices Used

None

Student Reactions

Student still shows good carry-over from previous job as far as terminology and machine operations are concerned.

EXPERIMENTAL INSTRUCTIONAL BULLETIN

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Surfacing fourth side of project cutting at an angle.	Demonstrating adjustment of cutter on shaper for surfacing fourth side of work. Demonstrating adjusting shaper so as to cut at an angle.	Adjustment of cutting tool to proper depth of cut.	Completed half of angle cut.

Special Aids or Devices Used

None

Student Reactions

Soon gained confidence and takes over in a very able way

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Surfacing hammer head on 4th side at correct angle.	Observation. Demonstration on how to make correct use of depth gauge jig.	None	Almost completed surfacing at angle on hammer.
	Special Aids or Devices Used Gauge for judging proper depth set of blade.		Student Reactions Has no trouble making accurate depth set with use of special jig.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Determining position for hammer head on handle. Drilling hole in hammer head for handle.	Explanation of metal spinning. Lesson for today: 1. Drilling of 1/4" hole in hammer head 2. Drilling of 1/2" hole in hammer head	Getting exact measurement with click-o-matic. Speed of drill was too high and bits were dull.	Drilled out hammer head for wooden handle.
	Special Aids or Devices Used Click-o-matic		Student Reactions: Student has fear of breaking drill.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Soften the hammer head that had become too hard to drive through. Student used shaper to cut second head. Annealing and hardening center punch.	Demonstrating use of the torch in softening metal. Student had to be told as he could not perform his operation.	Bits would not go through the metal head. The metal or head had to be softened with a torch and slowly cooled. Advise student not to force bit into metal too fast and cause over heat.	Head was softened.
	Special Aids or Devices Used Used micrometer jig.		Student Reactions Used knowledge from first hammer head to good advantage.

T1-1

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Orientation to transportation lab. Introduction to four stroke cycle engine.	Disassembly of head and ignition cover. Run engine. Explain basic operations of each part.	None	Very good.
	Special Aids or Devices Used Cut-a-way of 4 stroke cycle engine.		**Student Reactions** Seemed very interested in what he was doing.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Small engine tune-up Explain carburetor operation Clean spark plug Explain principle of valves	Use of spark plug cleaner - spark plug gapper. Start engine for sound. Removed valve, valve spring. Compression tool.	None	Understanding of how a 4-cycle engine runs Knows the difference between 2 and 4 cycle engine.

Special Aids or Devices Used

Cut away engine 2 and 4 cycle.

Brailled information on flywheel magneto.

Student Reactions

Likes this type of work.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Explain breaker points to student Remove bottom pan and remove piston Run engine and adjust Observe grease job being done on car chassis	Remove piston. Remove rings and replace. Replace piston.	Problem of heat from the muffler. Cover with asbestos for student protection.	Student liked to run engine and adjust the carburetor.

Special Aids or Devices Used

Mock-up of breaker point assembly

Cut-away engine

Student Reactions

Very much interested in what he was doing.

TI-4

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. Cooling system 2. Ignition system 3. Take off head - flywheel 4. Replaced head - flywheel	Inspection by removing blower housing. Removal of flywheel. Use of auto coil to explain the primary and secondary coil on the engine.	Explanation of coil and magneto. Could not understand the operation of more than 1 cylinder engine in relationship to 6 or 8 cylinder. Blow-up model of primary-secondary coil condenser. Background of electricity helpful-magnetic fields. Difference of ground and short important.	Student understands cooling system. Understands the magnetic field, not sure of the secondary coil and the points. No problem in use of wrenches.

Special Aids or Devices Used

Auto coil (cut away)
Condenser (cut away) (Delco Remy)

Student Reactions

Confusing. Bothers student when he does not understand theories.

TI-5

EXPERIMENTAL TRADE AND INDUSTRIAL EDUCATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Outboard motors	Examined outboard motor. Explained the differents parts and operation.	Hard to show the water jacket and its relationship to exhaust. Need better cut-a-ways. Same with intake and exhaust. Student still has trouble with how a mag. works. Needs large cut-a-ways of coils and magnets.	Understands outboard motors.

Special Aids or Devices Need

Cut-a-way of motor.

Magneto shaft.

Student reaction:

Enjoyed running an outboard motor.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Operation of multi-cylinder 4 cycle engines	Outline function of starter, generator, air cleaner, water pump, battery, oil filter, and the various assemblies on the engine.	Student can not see the relationship of the timing gear and distributor. Need an engine block mounted that student can see.	Student is beginning to see the relationship of the various parts of an engine.
	Special Aids or Devices Used		Student Reaction
	Cut-a-way of starter, air cleaner, water pump, battery, oil filter		"This is what I like about transportation."

T1-7

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	DIFFICULTIES ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Explain various parts of an automobile and remove front wheel	Adjust front wheel brakes. Disassemble front wheel and brake shoes. Raised car to show underneath structure.	Difficult for student to hold brake shoes in place when putting them back on.	Satisfactory.
	Special Aids or Devices Used Cut-a-way of rear axle. Car chassis.		Student Reactions None

EXPERIMENTAL INSTRUCTIONAL MATERIALS

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Change tire under road conditions Bike repairs, changed tire on bike wheel, bearings front wheel	Placement of spare tire in car. Lug wrench Jack Method was shown Student was then on his own to change a tire - return flat to trunk - also had to return tools to proper place. Coaster brake function - changed tire on wheel, aligned bearings	Car should be well blocked. Trouble placing wheel on alignment pin - used never car without alignment. Pin works better. Bicycle unit of repair fine for blind students.	Has good use of tools and understanding of bearings and wheel on bike.

Special Aids or Devices Used

None

Student Reactions

Liked bike repair.
Believes he could change auto tires.
Planned to ride bike as transportation.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Automobile chassis lubrication	Lubrication of chassis, oil starter, generator, distributor, changed air filter, checked water in battery and radiator. Tested air pressure in this. Checked oil level in engine, Transmission and differential. Checked brake fluid.	Locating fittings. Use braille lubrication chart for that make and model of automobile. Lubrication chart should be on plastic sheets. Check each joint to see that grease came through. Checking battery water (See special aids). Checking air pressure (See special aids)	The lubrication job completed.

Special Aids or Devices Used

Tire pressure gauge notched at 28 lbs., 30 lbs.

Used syringe from battery water container to check water in battery.

Student Reactions

Pleased with his achievements.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Automobile ignition Different types of engine 1. Valve-in-head 2. Valve-in-block	Explained everything to student on motorized engine first. Student was then showed the various parts on a regular engine.	By using the motorized engine our student was able to understand more easily how the engine operated. Understood the ignition system more fully. Had trouble understanding valve-in-head. Have mock-up of valve-in-head. Have an over-head valve engine to take apart. Have a valve-in-block engine to take apart.	Had very good results by using the engine we did.
	Special Aids or Devices Used Motorized engine (slow motion engine run by an electric motor)		Student Reactions Seemed very interested.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Rode tandem bike. Take bike brake apart.	Pointed out various parts of a bicycle. Let student take coaster brake apart. Reassemble coaster brake. Adjust handle bar and seat. Tightened spokes.	None	Very interested in bicycle work. Student can feel nut and pick out correct size wrench the first time.
Special Aids or Devices Used Cut-a-way of coaster brake			Student Reactions Good

T2-1

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Orientation to shop	1. Demonstrating the pieces of equipment and basic power plants in lab. 2. Also testing equipment used on engines. 3. Layout of lab and the areas represented. 4. Lecture on areas taught as they were showed to the student.	1. Probably too much to show student in one period. 2. May be one area or one half of the lab should be shown in one period.	1. Student asked questions as a result of being shown Too much to grasp in one period.
	Special Aids or Devices Used None		Student Reactions 1. Enjoyed tour of lab 2. Impressed at size of lab and many areas represented.

T2-2

EXPERIMENTAL INSTRUCTIONAL EVALUATION

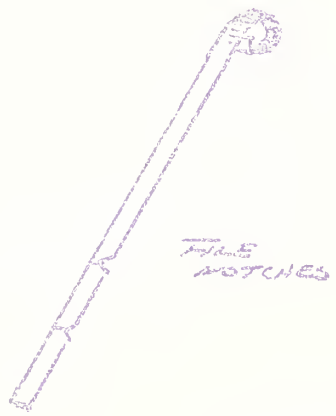
LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Small Engines 1. Piston 2. Valves 3. Rings 4. Crankshaft 5. Removing offhead 6. Magneto spark (Orientation of the above) Spark plug cleaner	1. Use of a cut-a-way model showing to relationship of parts and how they function. 2. Lecture as parts are discussed. 3. Actual operation in cleaning a spark plug.	1. Showing how the points open. 2. Used a feeler gauge to show student when they opened. 3. Knowing when plug is clean. 4. Use a slender pointed tool to check to see if plug is clean.	1. Understanding of engine parts. 2. Can clean spark plugs. 3. Started 4-cycle, 1-cyl. engine.

Special Aids or Devices Used

Cut-a-way 4-cycle
1 cylinder engine

Student Reactions

Asked several questions during instruction.

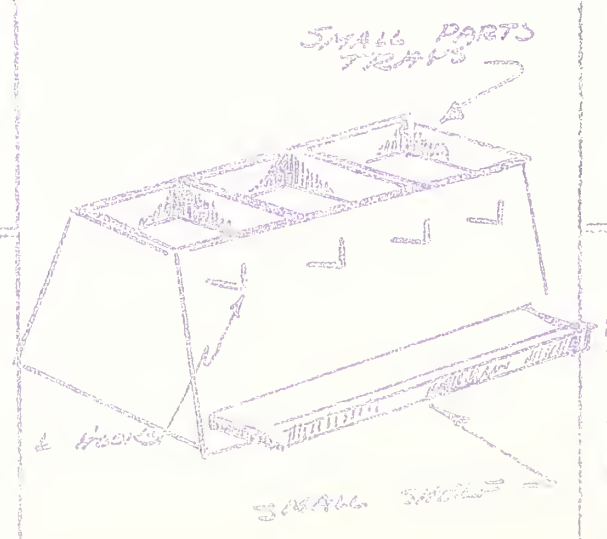
LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. Orientation of automobile a. Body parts b. Functions c. Engine acc.	1. Demonstration by student going over general parts found on an automobile ('56 plymouth used) 2. Lecture on the parts (major) of the automobile as each was shown to the student. 3. Actually washed part of automobile in demonstrating care of it.	1. Cannot read instruments. 2. Shake car with gas cap off to check if it has gas. 3. Check radiator to check temperature. 4. Reading oil dip stick. 5. Use can with attached brush to clean tires. Spray-type can did not work very well. Suggestion: File notch at "Full" and "add oil" marks 	1. Student could hear gas in the tank as he shook the car. 2. He learned general automobile information such as fenders, dash, hood, etc. very well.
	Special Aids or Devices Used		Student Reactions Asked questions and was very interested in the car and its parts.

T2-A

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Familiarization of small engine 1. Removing engine head a. Selection of proper tools a. Breaking bar b. Ratchet wrench - extension bar c. Open-end wrench 2. Gas tank removal 3. Inspection of valves and cylinder walls Used with engine head removed, student was able to turn crank shaft and actually see the 4 cycles in operation.	Student performance with special teacher instruction.	1. Selection of correct wrench to fit a particular nut or bolt. a. Only experience will remedy this situation. 2. Difficulty in re-positioning gas tank (holes would not line up). a. Used alignment pin to locate holes. 3. Student had difficulty in locating tools he used even though they were placed neatly on working bench. a. A small portable tool board to hold only those tools need for dis-assembly.	1. Time consuming but satisfactory. During replacement of parts student used good judgment in tool selection.

Special Aids or Devices Used



Student Reactions

Student claimed to be better acquainted with engine parts and tools used in dis-assembly. Felt he could repeat operation without assistance. Does not feel mechanically inclined but enjoyed working with automotive engines and tools.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Magneto spark system Battery spark system	1. Student traced system on engine as instructor lectured on it. (magneto system on 1 cylinder engine) 2. Traced battery system on a teaching aid board. 3. Allowed student to hold plug wire and pull engine through to experience how a spark plug is fired by the shock he receives.	1. How can lobe on crankshaft that operates points be shown? 2. Taking crank out too time consuming. 3. Primary and secondary circuit explanation.	1. Use a model to show lobe in crank. 2. Understood difference between the two ignition systems. 3. Did not like the method of checking for a spark by holding the sparkplug wire and pulling engine through.

Special Aids or Devices Used

1. Cut-a-way on 1 cylinder 4 cycle engine.
2. Model of point action in a distributor.
3. Electrical system of a car mounted on board.
4. Cut-a-way spark plug.
5. Cut-a-way of a battery.

Student Reactions

Said that he knew more about firing system and understood its function on an engine.

Spark plugs a. Inspection b. Setting gap c. Clean and test Hot and cold plugs a. Explained difference	Chevrolet 6 engine	Gauge pliers slipped. Torque wrench - high range. Spark plug rack - numbered Have large torque wrench or adapt Snap-On torque wrench to wrench scale.	Removed all plugs, inspected. Cleaned and tested. Set gap. Proper reinstalling of plugs.

Special Aids or Devices Used

AC plug cleaner and tester.

Thickness gap setter gap gauge

Spark plug training aid (Instructor)

Torque wrench - socket slip type

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Engine tune-up Service air cleaner Check fuel filter Inspect fuel lines Compression test Chev. 6	Shop engines - demonstration of distributor Distributor taken home for homework orientation.	Car batteries discharged. Engine could not be started. No way to indicate strobe marks on distributor tester. Portable work bench - Magnetic or expandable screwdriver and wrenches (prevent dropping small part)	Completed principlon of tune up. Incomplete due to inoperative engine.

Special Aids or Devices Used

Piston model - valve model
Sun motor tester unit
Compression check unit
Distributor tester
Ignition tool rack

Special Considerations

Position of points hard to locate.
Use of small tool difficult to manipulate.
Additional work needed on distributor operation.

ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. Wheel bearing packing a. Wheel removal b. Race removal c. Cleaning bearings in solvent d. Inspection e. Pack bearings f. Replace bearings g. Replace wheel 2. Inspection and orientation of under car lube fittings 3. Differential operation (cut-a-way used to explain planetary gears)	Explanation - Demonstration Student performance	1. Student rested hands on brake lining leaving a greasy surface a. Linings should be covered with cloth or thick rubber band cut from old inner tube. 2. Student experienced difficulty moving from one end of the car to the other due to hanging parts - wheel, etc. a. Placed one arm over forehead and used the left as a guide.	Student performed wheel bearing pack very successfully.

Special Aids or Devices Used

Torque wrench with spring indicator.

Student Reactions

Felt he could repeat wheel bearing packing with little or no difficulty. Learned much but forgot some of the names of parts.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Automobile brake system	1. Showing student parts of brake and how they function by demonstration and lecture. 2. Actually adjusted brake. 3. Took apart brake unit and reassembled same.	1. Different types of adjustments (Chrysler and General Motors). 2. Suggest showing both types. 3. Use of special brake tools (needed only practice to use efficiently).	1. Did very good on brake assemble. 2. Did okay on adjusting.

Special Aids or Devices Used

Cut-a-way brake unit of an auto

Student Reactions

1. Asked several questions on brake functions.
2. Said that he understood more about brakes now.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Bicycle Tandem bike Road test with bicycle	Bicycle work bench Bicycle - general orientation of parts Adjustments of chain, seat. Bendix brake. Musselman brake. New departure brake.	Need: parts compartment rack for disassembly of parts.	Pupil rides bike. Well acquainted with basic parts. Disassembly of all types of brakes.
	Special Aids or Devices Used Model - brakes assorted Text - "It's Easy to Fix Your Bike"		Student Reactions Interested in brake action and different types of brakes. Would like to make tandem.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Road tested tandem bicycle with sighted instructor.	Disassembly, orientation and theory - student performed all mechanical work.	During disassembly of parts, it was noted student did not orient himself completely with the position of movable sections. Hence, during assembly parts would not align properly. a. Scribe or mark a line on movable parts before tearing down assembly. Student felt explanation of theory should be presented slower because of required concentration needed to examine parts completely.	There has been a very obvious growth in the student's thinking. The short mechanical experience he has been exposed to has proven growth not only in vocabulary but in his ability to reason and relate previous instruction with each new topic.
Electrical auxiliaries of an automotive engine. a. Generator b. Voltage regulator c. Starter d. Horn Note: Each of the above were disassembled and reassembled by the student.			

Special Aids or Devices Used

No special equipment was needed.

Student Reactions

Asked intelligent questions regarding the electrical system of the automobile.

W1-1

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Orientating student to shop and tools. Questioned him as to his past experience in woodwork, and capability	Discussion and selection of project. teacher made Examined/braille plan of project selected. Examined teacher made model of project. Discussed its construction.	Discussed plan and project.	Student has had enough past experience in wood to cause him to be anxious to get started on present job, which he is anxious to complete.

Special Aids or Devices Used

Raised line drawing kit.

Brailled section from text on cross cut and rip saw.

Student Reaction

Very responsive.

WL-2

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	REMARKS
Explained project and how drawing	Demonstration		
Checked drawing for dimensions	Question and answer		
Explained principles involved			
Explained how lumber is ordered	Lecture		
Measuring	Demonstration	Measuring 27" with steel tape. This tape should be marked every inch for at least four feet.	
Cut off one end of board for practice	Supervisory		
Measured length and cut allowing for waste	Supervisory		
Stock glued up and assembled	Demonstration	Should have line on each side of board to keep edge square or use sandwich board.	
Practiced planing	Supervisory		

Special Aids or Devices Used

Braille ruler
Braille steel tape
Sandwich board used for holding wood for ease in end planing.

Student Evaluation

Excellent ability to memorize information and retain same.

Good manual dexterity.

VI-2

EXPERIMENTAL INSTRUCTIONAL SHEET #2

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Practice planing end grain	Supervision	Cautioned student to keep plane at an angle to make shearing cut on end grain.	Student did not [illegible]
Set one end of board in miter box for practice	Demonstration	Dull circular saw, student had to exert great pressure to keep wood from sliding up on saw. Keep saws sharp.	Overcompensate pressure.
Taught use of table saw including four point safety program	Demonstration		Edge planed was square and straight.
Ripped piece for practice	Supervision		
Set saw and ripped piece for project	"		
Planed edge to exact width	"		

Special Aids or Devices Used

None

Student Reactions

A bit nervous when he had practice cut himself.

Nervousness disappeared when making regular cut.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Cutting to line on jig and saw by use of jig Adjusting blade and fence on jig saw for cutting pieces to length	Discussion on cutting board and pieces to length Demonstrating use of jig saw and use of cutting design	Following line by use of jig on band saw. Adjusting guard on circle saw for protection when cutting short pieces. Present type of guard very unsatisfactory.	Excellent

Special Aids or Devices Used

Band saw jig

Student Reactions

Shows interest in learning.

Very cooperative.

Is inclined to ask for aid in a strange situation.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Explained dado head for saw.	Lecture		Very good.
Showed how to put dado head on table saw.	Demonstration		Student had no trouble putting dado head on. He was able to set fence on table saw to correct measurement but with difficulty using sliding combination ruler.
Student installed dado head.	Supervision		
Set saw and cut dado in end piece of bookshelf.	Supervision		
Layout of cuts on end pieces.	Demonstration and supervision.	Correct lines left on work have to be sanded out. Should make them pencil and trial.	
Student layout on end pieces.		Suggestion on bottom for marking with pencil on combination square to make it easier to set table saw or cross saw.	Student responded: Said he did not feel nervous about using [illegible] saw now, but enjoyed it.
Combination square ruler.			

Correct measurement
fence
Weld a small strip on one end of sliding head to use on table saw as allow to lay flat set by holding head against fence.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Explained the use of jig saw	Lecture and demonstration	None	Trial cut on jig saw was excellent.
Practice cutting on scrap piece	Individual instruction		Jig saw cut on pieces for project was fair, requiring a little finishing with wood file.
Laid out design on bottom of end pieces	"		
Cut pieces on jig saw	"		Band saw cuts were not as good as jig saw cuts.
Laid out design on top of end pieces	"		
Nailed two end pieces together and cut on band saw	"		

Special Aids or Devices Used

Special guides on jig and band saw

Dividers

Braille ruler

Student Reactions

Easier to follow line with jig saw than band saw.

Layout lines confusing with line to be followed.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Cutting to line on band saw Filing with surform sanding	Demonstration and Instruction	Surform not too satisfactory for filing across end grain because of splintering. Had difficulty following line, especially on band saw. Saw should have narrow blade for surform work.	Student has completed band saw operation, jig saw cutting to line, filing, and sanding.

Special Aids or Devices Used

Jig for sawing on jig saw

Student Reactions

Interested in checking work for exactness.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Explanation of the types of glue and the bar clamp.	Lecture and demonstration.	Student had trouble spilling glue on his project. Should have squeeze bottle for cold glue that has a small nozzle. By having a small nozzle the glue will not run out unless bottle is squeezed.	Very good with the exception of getting glue in the right place.
Glued and clamped end pieces to shelf of bookshelf.	Demonstration and supervision.		
Explained the difference between nails and brads, and their sizes.	Lecture.		
Explained the different types of screws and how they are marked. Also the countersink.	Lecture.		
Explained types of sandpaper, how it is graded and made.	Lecture		
By this time the glue had time to set and student removed clamps.	Supervision.		
Sanded project to remove excess glue (Supervision)			
Put on wood sealer by using rag (Demonstration and supervision)			

Special Aids or Devices Used

None

Student Reactions

Student was very pleased at being able to assemble his project. Student was more worried about getting glue on his clothes than on his project.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. Applying a run-on finish. 2. Use of steel wool between coats. 3. Cutting miter joint on miter saw. 4. Demonstration of lap joint. 5. Making of lap joint using click-o-matic. 6. Marking gauge and square cutting with chisel.	1. Demonstration 2. Discussion 3. Review of operations and related information covered since beginning of project. 4. Discussing various joints and how they are made. 5. Demonstrating a miter joint being made on miter saw. 6. Demonstrating use of chisel.	Difficulty in determining correct amount of finishing material.	Shows ability to retain learning well.

Special Aids or Devices Used

Use of ray instead of brush

Click-o-matic rule

Student Reactions

Feels as though he has accomplished more during six weeks than ever before.

WI-10

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Applying third coat of general finishes. Locating hole by use of dividers and click-o-matic. Selecting correct style of bit. Drilling with hand drill. Discussion of bit style for hand drill Acquainting student with power drill press. Discussion of safety measures for drill press.	Demonstration of use of bits, auger. Discussion of various sizes. Demonstrating use of brace and bit. Demonstrating use of ratchet. Marking place for drilling. Discussing difference in high speed bits and auger bits. Demonstrating use of hand drill. Presentation of problem for student to solve on his own.	Locating exact place for drilling with brace and bit.	Measuring bits with click-o-matic quite difficult.

Special Aids or Devices Used

Tried measuring size of bit with click-o-matic rule

Student Reaction

As problems arise, Roy does not hesitate to express his opinion.

Does not do work without knowing why.

W2-1

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Demonstration	Lecture and demonstration. Detailed instructions on special tools for the blind and general safety in laboratory.	None	Student seemed to have learned laboratory technique very well, in a very short time. He became acquainted with new tools on braille test panel.

Special Aids or Devices Used

Special braille tools

Student Reaction

Interested in tools for the blind.

EXPERIENCE INSTRUCTIONAL EVALUATION

UNIT OR ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Project planning selection of wood	1. Lecture on origin of wood 2. Types of woods 3. Classification of woods 4. Types of materials (Ex. MDF) Ref. index	1. Trouble getting across plain sawn and quarter sawn lumber to student. Suggest using rubber band drawing to get idea across.	Student is familiar learned more about wood. He has experience help with plain sawn quarter sawn

Special Aids or Devices Used

Raised line drawing kit

Student Reaction

learned very easily
Could be cut between
to produce value drawing

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Jointer orientation and proper procedure in use of same	Type recording of how jointer works with parts of machine explained. Also a review of safety rules in the use of the jointer.	Proper holding of rods while they were pushed through the jointer. Practicing should remain as we thought it might be.	Each individual in student opinionaire

Special Aids or Devices Used

None

Student Reactions

Very good.

Asked many questions

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Use of power saw a. Orientation b. Ripping stock c. Cross cutting of stock Use of planer and how it works Had a look at second type of table saw guard and was able to compare it with first one.	By satisfactory explanation and by having student practice knowledge and information acquired.	Had never used a push through stock. Fair knowledge of saw guard but needed some help in its use.	A great deal of information in the use of these machines for the student.

Special Aids or Devices Used

Feather board

Braille ruler

Student Reactions

Seemed to enjoy his lesson.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
1. Types of glue 2. Types of clamps 3. Glueing up operation 4. Orientation of wood lathe	1. Lecture 2. Demonstration 3. Actual experience	1. Problem - grain direction 2. Traced with sharp punch 3. Had difficulty in using parallel clamps	1. Learned names of lathe tools 2. Use of clamps
	Special Aids or Devices Used Tape Recorder		Student Reactions 1. Did very well 2. Asked questions on clamps and lathe. 3. Wants to start lathe as soon as possible.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Getting stock ready to put in lathe Second part - actual turning using large gauge	Proper safety methods in use of lathe. Cutting and marking of stock so it would fit properly the head stock of lathe. Also preparation of stock at tail stock end. Use and practice of gauge chisel.	Distinguishing scratch awl marks on end grain. Use back saw to mark center to set spur.	Stock rounded 2/3 of its length and very well done.

Special Aids or Devices Used

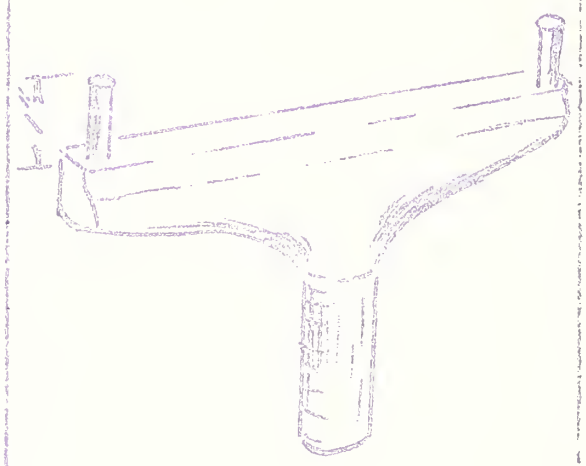
Braille calipers

Braille ruler

Student Reactions

Very satisfied with what he did.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Project: Baseball bat 1. Rough turning on wood lathe	Supervisory - Student turned using rough gauge	Stops on the tool rest. Need stops to keep tool on rest. Use dowel-type stops if possible. 	Student used rough gauge with more efficiency than before.

Special Aids or Devices Used

Used stops made of plywood on the tool rest to keep tool on rest at end of cut.

Student Reactions

Pleased that he could use tool better.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Finishing lathe work on his project (baseball bat) Sanding	Proper holding of wood lathe tools to make a smooth finish.	Discussion as to proper method regarding safety regulations in sanding.	Finish turning on lathe very satisfactory. Sanding on lathe project to pupil's satisfaction.

Special Aids or Devices Used

Special tool rest with pins to limit travel of the turning tool.

Student Reactions

1. Liked proper method in using tools and sandpaper better than the method used before.

W2-10

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Applying finish (oil and shellac)	Demonstration Lecture	Apply with lathe off to keep from slinging finish off before it has a chance to set.	Applying finish by student satisfactory.

Special Aids or Devices Used

None

Student Reactions

Pleased with finished product.

Learned the use of lathe tools.

Learned safety techniques of lathe.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Orientating student to lathe and table saw. Talked and came to a decision on project to be made kind, size, etc. (Turned bowl)	Oral demonstration of lathe safety. Student operated saw for first time after demonstration	None	Good

Special Aids or Devices Used

Click-o-matic rule

Student Reactions

Very nervous at first.

Not afraid as before.

Not as hard as anticipated.

Liked operation.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Cutting stock on table saw into squares	Supervision of student while cutting.	Confused as to what step comes next.	Let wood slip a little to mark up end grain on one board.
	Special Aids or Devices Used Click-o-metic rule		Student Reactions Very happy with saw operation, not afraid anymore.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Gluing up stock for project for lathe	Directing student's finger in putting on glue.	Student not knowing if board is covered completely with glue.	Rather slow but satisfactory results.
Mixing glue	Stressing not to put in too much water. Add small amounts as needed.	Drawing accurate measurements.	Needs more experience in drawings.
Adjusting clamps to approximate width.			
Gluing paper between dummy block and project wood.			

Special Aids or Devices Used

Braille ruler

Raised line drawing kit

Student Reactions

Fun to use glue. Plans to use this kind of glue later.
A little confused on drawing.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Fastening face plate to stock Drilling pilot holes for screws Putting in screws Orientate student to band saw Practiced sawing scrap wood	Explaining necessity of putting screws tight. Explaining necessity of centering face plate. Using compass to find center. Demonstration using twist drill with fingers to center screw holes.	Had trouble centering plate. Sawing to curved line on band saw.	Student is slow, does not like to work fast. Improved attitude when working with machine.

Special Aids or Devices Used

Click-o-matic rule

Special guide for band saw

Student Reactions

Student seemed frustrated today.

W3-5

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Sawing project round on band saw Turning project on lathe	Demonstrate and let student proceed. Showing correct procedure.	None	Very good A little afraid to use tool correctly. Finally held tool his own way which was taught to him at school. His method worked very well.

Special Aids or Devices Used

Driving nail in scrap for project wood to rotate on while cutting on band saw.

Student Reactions

Marveled at jig for cutting circle on band saw.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Finishing outside of bowl except for sanding	Demonstration guiding student's hand.	None	Very good.
Start cutting out center of bowl	Drilling hole in center as guide point - stop block taped to tool rest as outside stop.		

Special Aids or Devices Used

Stops taped to tool rest for chisel.

Student Reactions

Very anxious to work today.

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Continue turning out inside of bowl Teaching method of measuring depth with rule and straight-edge	Same as day before.	Insist upon feeling work while cutting, thus will not keep finger on tool rest as guide.	Student has tendancy to take light cuts. He is afraid of cutting too deep.

Special Aids or Devices Used

Click-o-matic rule

Student Reactions

Does not like to stop and measure.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	REMARKS
Continue turning inside of bowl	Guidance and demonstration	None	Difficult to cut center flat.
Sanding bowl	None needed		
	Special Aids or Devices Used		Student's Evaluation
	Click-o-matic rule		Afraid he would cut too deep.

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Continue sanding bowl	Instruction given yesterday. Emphasized to student not to let corner of sanding block touch sides.	Burned a small section by holding sandpaper still while piece revolves.	Very good
Lecture on finishing	Explained why different finishes are used.	Cannot feel burned places on wood.	

Special Aids or Devices Used

None

Student Reactions

Determined to get project smooth. Well pleased with results.

EXPERIMENTAL INSTRUCTION & EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Complete sanding of bowl Applying finish Cutting bowl away from dead stock Sanding bottom	Instruct student as to method of applying finish of linseed oil and pumice stone. Demonstrating use of chisel and mallet.		Very good.

Special Aids or Devices Used

None

Student Reactions

Well pleased.
Mental picture of bowl at beginning approximately same as finished project.
Likes linseed oil finish.

W3-11

EXPERIMENTAL INSTRUCTIONAL EVALUATION

LESSON ACTIVITY	METHOD OF INSTRUCTION	PROBLEMS ENCOUNTERED & SUGGESTED CHANGES	RESULTS
Sanding bottom and applying linseed oil and pumice stone for completion of bowl	Verbalise	None	Scratched side slightly while sanding bottom otherwise job well done.
Add wax finish	Explain same as shining shoes.		

Special Aids or Devices Used

None

Student Reactions

"Never thought it would look this good."

Really enjoyed turning this project.

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